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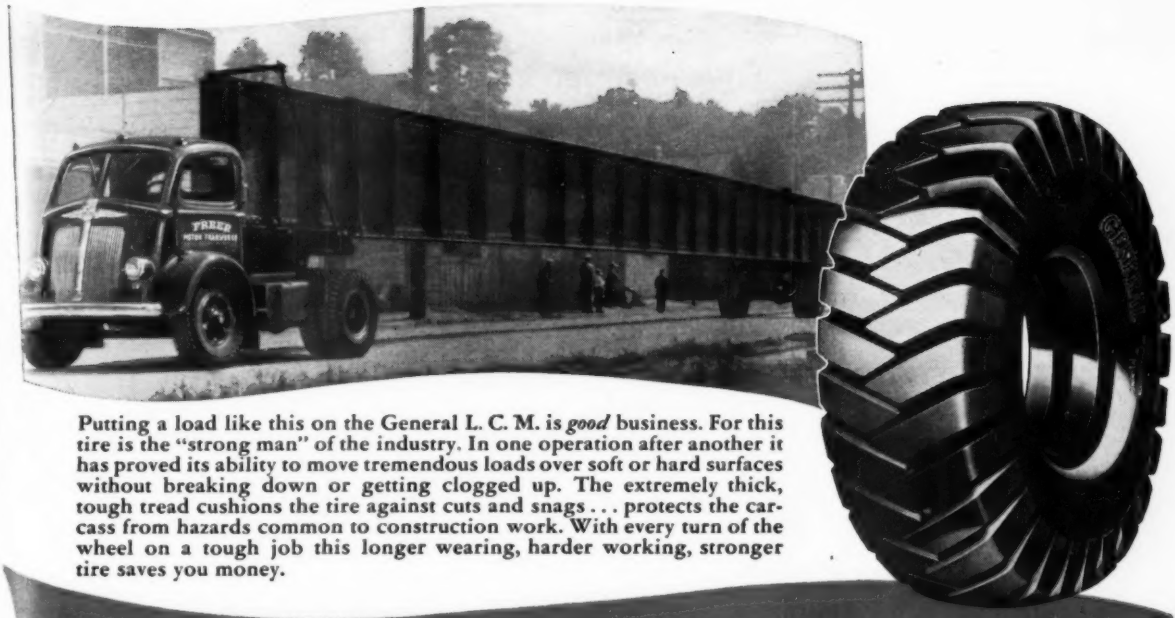

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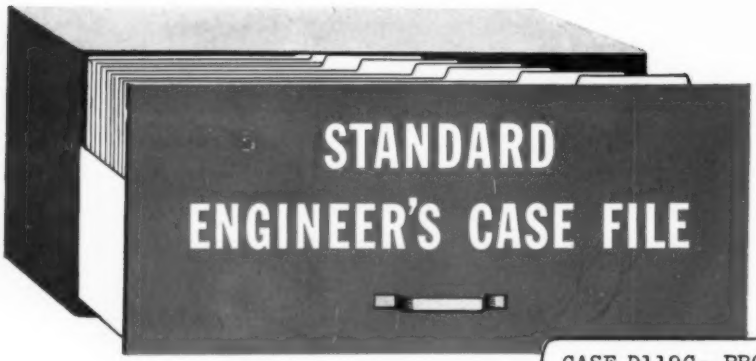
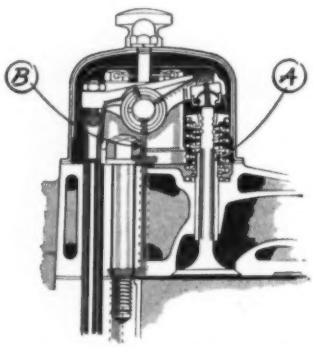


CASE D119C--PROVIDING GOOD VALVE ACTION IN DIESEL ENGINES.



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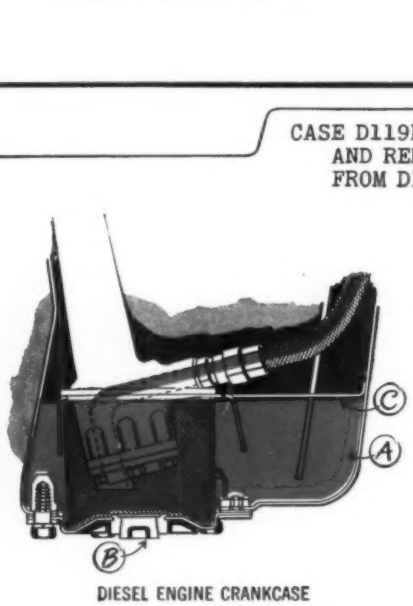

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Cylinder walls, pistons, bearings and other parts of Diesel engines in heavy-duty service remained free of lacquer, and all contaminants flowed out with drainings when RPM DELO Diesel Engine Lubricating Oil was used.

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He's Fussy about Rope Lubrication

The Bethlehem wire-rope man has an eagle eye. He can spot a "dry" rope a mile away . . . although he doesn't like to find one, for hard-working wire rope should never be allowed to operate dry—unlubricated—for any length of time.

This is a fundamental too often overlooked. Frequently Bethlehem engineers encounter ropes so dry that serious harm has already resulted. Sometimes—strange as it seems—the user doesn't realize how *vital* lubrication really is. Sometimes he's merely forgotten—or meant to take the proper steps but got too busy.

For best results and longest life, wire rope must be lubricated. Why? Because lubrication reduces internal friction—the friction of wire against wire. Because it reduces the friction of rope against sheaves, rope against drum. Because—important!—it helps prevent destructive rust from getting a start.

True, in some services, the original factory lubrication provides adequate protection throughout the useful life of the rope. But this is not *always* the case. So, when a Bethlehem man comes to check your ropes, lubrication is one of the first things he'll look into. It's his business to see that you get the correct wire ropes for your job—but he also wants you to *get the most out of them.* Proper lubrication is a long step in this direction.

If you need advice on this or any other wire-rope problem, call for a Bethlehem engineer. He's part of a nationwide network whose services are always available.

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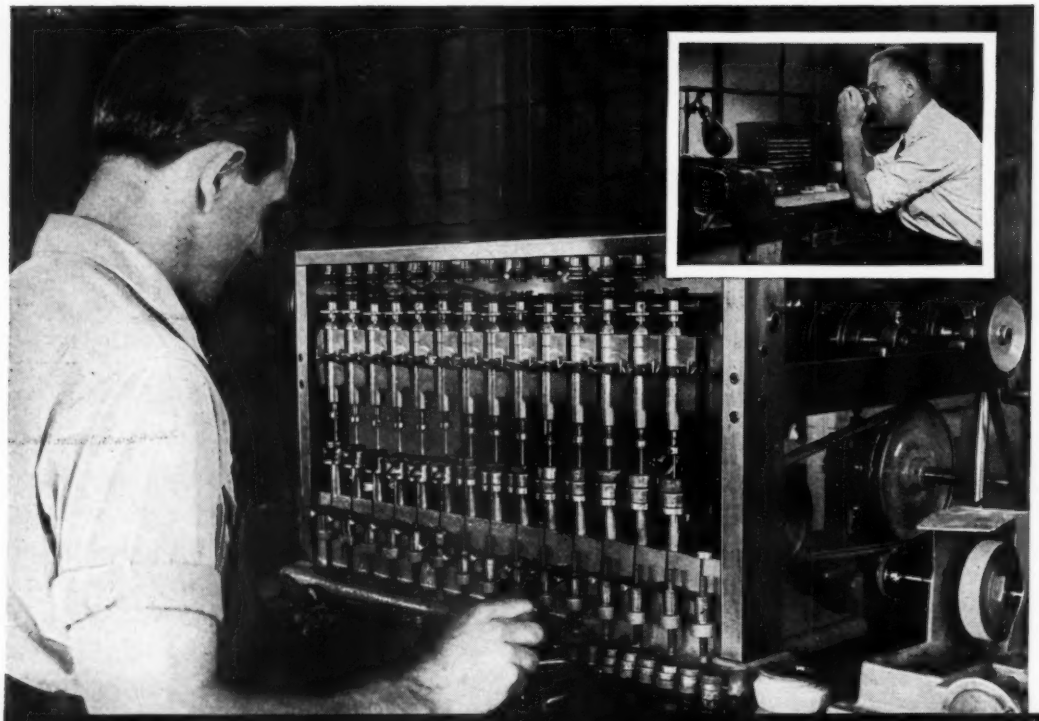

These 'Drill Masters' Develop Precision in Wickwire Rope

The workability and durability of wire rope is largely dependent upon accurate coordination of each wire in the rope. Because off-size wire can cause excessive friction and internal rope wear and early failure in service, every wire must be perfect in shape to fit into the exact geometric construction pattern of the rope.

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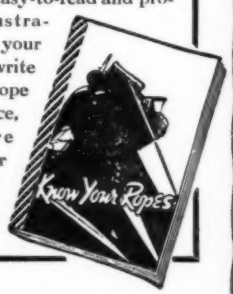

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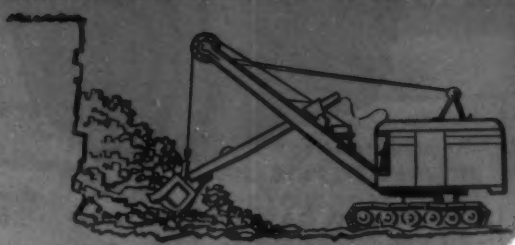

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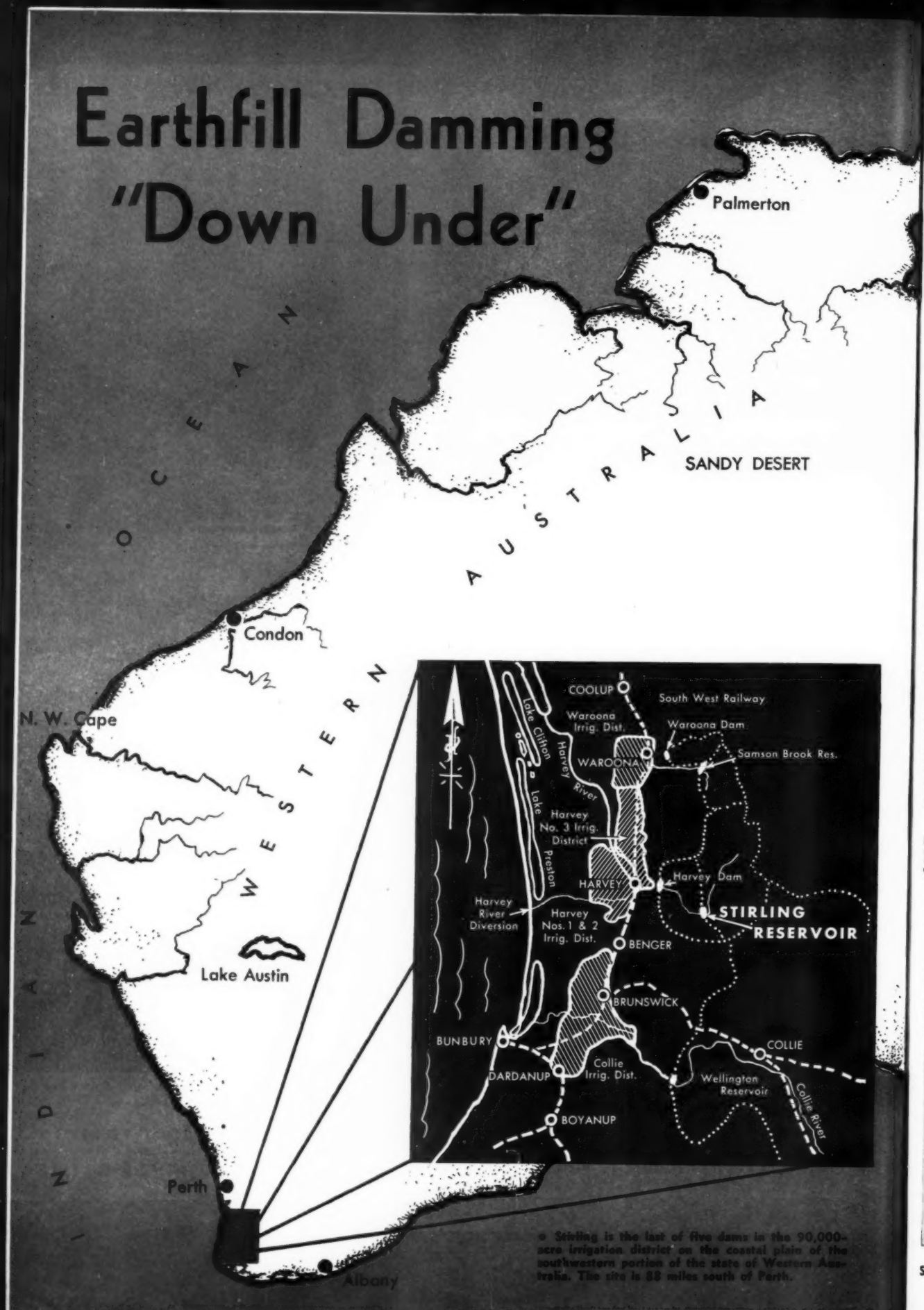
Earthfill Damming "Down Under"



• Stirling is the last of five dams in the 90,000-acre irrigation district on the coastal plain of the southwestern portion of the state of Western Australia. The site is 88 miles south of Perth.

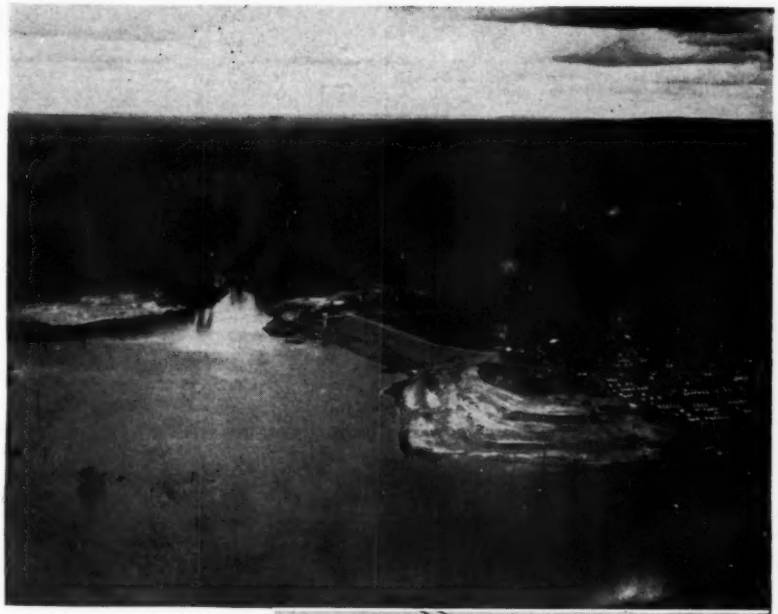
This article tells the earthmoving story of Australia's highest earthen dam—Stirling, located near Harvey, Western Australia, 88 miles south of Perth. The ¾-million-cu. yd. structure impounds 44,000 acre-feet of water to form the second largest reservoir in the state.

by **S. B. Byass, B.E., A.M.I.E.A.**
Resident Engineer, Stirling Dam

STIRLING Dam is the last of five reservoirs constructed in the Waroona-Harvey-Collie district in Western Australia for irrigation supply purposes. The district is on the coastal plain of the southwestern portion of the state and extends from 40 to 100 miles south of the capital, Perth.

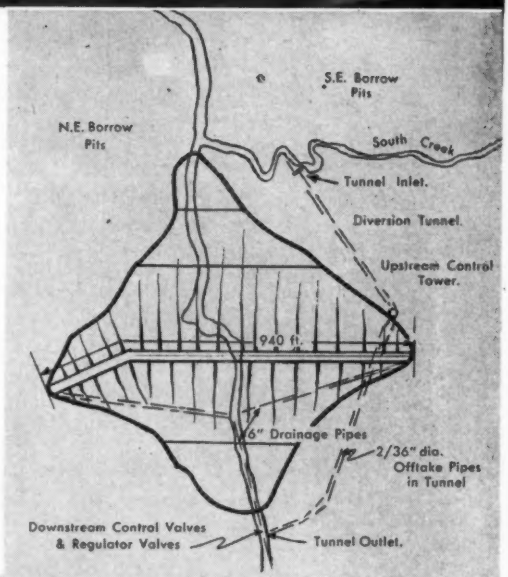
The first four structures of the now-completed system and their capacities are: Drakesbrook (or Waroona), 500-million gallons; Harvey, 2,275-million gallons; Wellington 7,500-million gallons; and Sampson Brook, 1,777-million gallons. Drakesbrook and Sampson Brook dams are both earthen structures, the others being concrete. The total area under irrigation by the four dams exceeds 90,000 acres.

With its 148-ft. height above stream bed level, Stirling is the highest earthen dam in Australia. The crest length is 950 feet, and

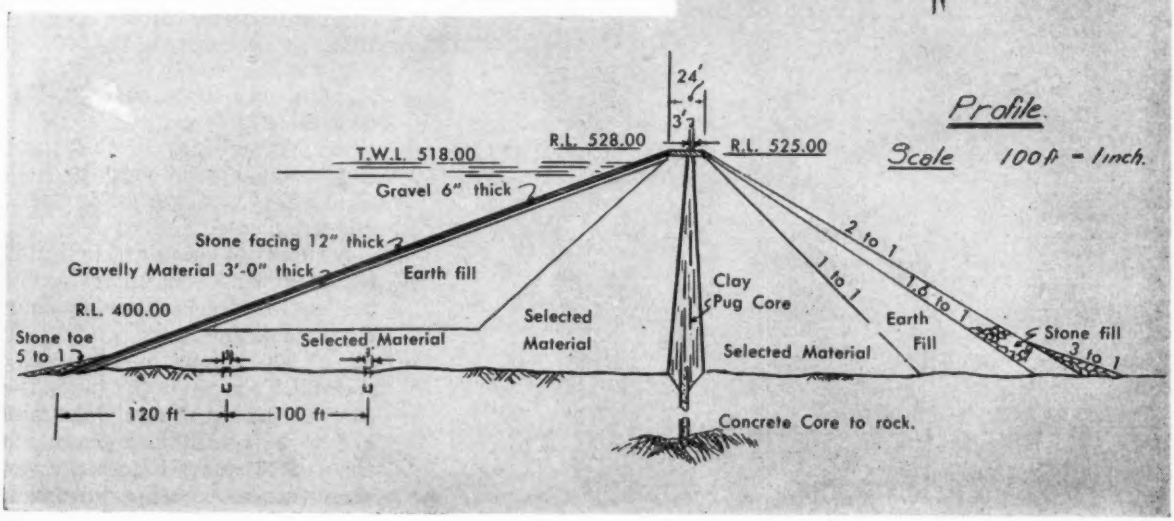


• **Above: Aerial view from upstream (looking southwest) of, from left, shovel borrow pits, bywash (spillway channel), main embankment, scraper borrow pits, and campsite for construction personnel.**

• **Right: Sketch of site shows relation to each other of major parts of Stirling Dam.**



• **Below: Sketch of typical cross section of main embankment, which is 850 feet wide at the base.**

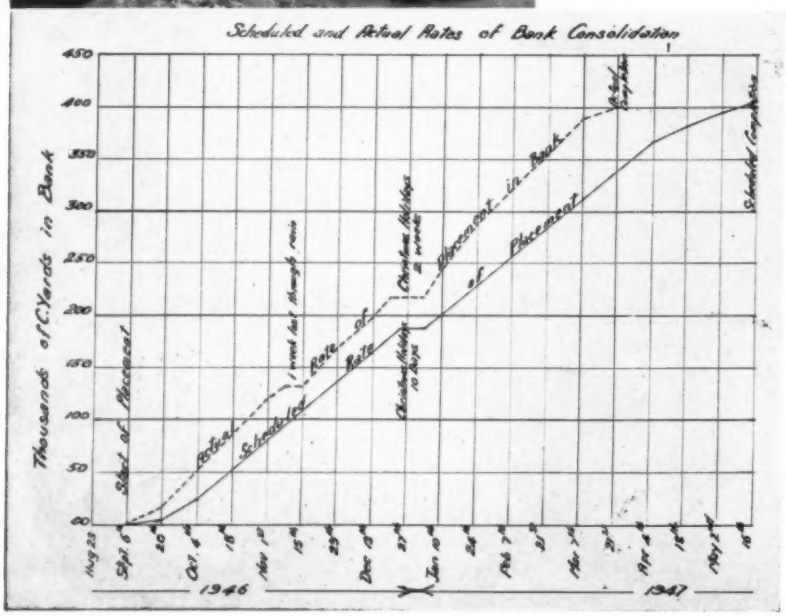


• Above: As the bywash (spillway channel) approaches maximum 55-ft. cut, a Ruston-Bucyrus 10-RB shovel loads blasted rock to a 5-yd. dump.

• Left: Hand-finishing the bywash excavation.

• Left: The concrete spillway (under construction when this photo was taken) required 650 cu. yds. of concrete.

• Below: Graph shows progress of fill work on main embankment during final season.



widths are 24 feet at the top and 850 feet at the base. The structure contains about 726,000 cu. yds. of material— 626,000 earth fill, 76,000 rock fill, 15,000 pug (impervious) core, and 9,000 cu. yds. of concrete. The 1000-acre basin will contain 12-million gallons (44,340 acre-feet) of water, and is the second largest in the state of Western Australia. (Largest is held by the 218-ft. Canning Dam for water supply to the city of Perth.)

Situated on the Harvey River, 11 miles east of Harvey, Stirling Dam was constructed by the Public Works Department of Western Australia—irrigation authority for the state government. Work started in 1940 under then-prevailing unemployment sustenance work conditions.

Operations came to a halt in January, 1942 after the declaration of war against Japan, and recommenced in October, 1945 with a gradual re-assembly of men and machinery. A highly successful "all-out" effort was made to complete the project last summer.

Construction Milestones

Significant milestones for the project included: August, 1939, when access roads were started; December, 1939, start of diversion tunnel boring; October, 1940, diversion of stream through completed tunnel and start of earth work. At the time work ceased (January 1942) due to the war, earth fill placed totalled 176,000 cu. yds., pug (impervious) core, 8,800 yds.; and rock fill, 27,900 yds.

When earth fill resumed in early 1946, an estimated 176,000 cu. yds. were already in the bank. Pug in place was 8,800 cu. yds., and rock fill, 27,900 cu. yds. Between February and May of that year, an additional 75,000 yards of earth fill, 4,000 of pug, and 7,000 of rock fill were placed.

A survey at this stage indicated the following quantities were needed to complete the embankment: 405,000 cu. yds. of earth fill, 23,000 of pug and 30,000 of rock fill. To wind up the job in the 1946-47 season, these quantities had to be placed in a maximum span of 36 weeks before the wet season set in. Actual performance,

however, was 26 working weeks, allowing a substantial margin of safety.

This article is mainly an account of those 26 weeks, when the major part of the work on the dam was accomplished.

At the damsite, clayey soils of granitic and dioritic origin lie over dense granitic rock intersected by dioritic dikes. This bedrock, to which the cut-off wall of the dam was joined, was as low as 108 feet below ground level.

Stripped by Hand

Stripping of the site of the embankment kept just ahead of the earthfill work. The 12 to 18-in. layer which had to be removed was found to be so interspersed with outcropping granite boulders that it was thought inadvisable to use power excavating equipment. Stripping work was performed largely by hand-loading the material to horse-drawn carts. At the ends of the embankment, some stripping was done by bulldozers when they could be spared from other work on the project.

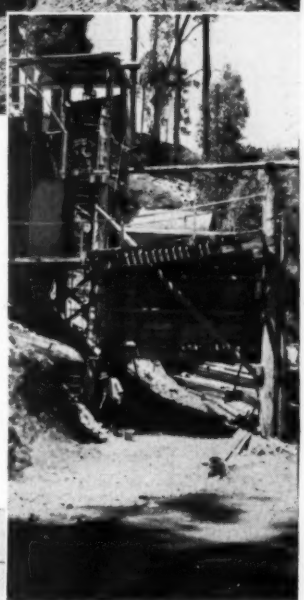
By means of auger borings and hand-dug trial shafts, two good borrow pit areas were located close to the embankment site. One was at the southeast corner across a southerly branch of the river, and the other area was northeast of the damsite.

Material found in the southeast borrow pit consisted of decomposed granite clays and loams varying in thickness from 30 feet in lower levels to 15 feet in higher levels. Mica schist was present but in very small proportions. Pockets of kaolinized granite had to be discarded.

The northeast borrow pit contained a mixture of soils of both granitic and dioritic origins ranging in depths from 15 to 30 feet as before. This area however, was crossed transversely by hard decomposed granite bars. Since this pit was used almost exclusively for scraper loading and hauling, the granite bars caused some inconvenience.

Shovel Work in SE Pit

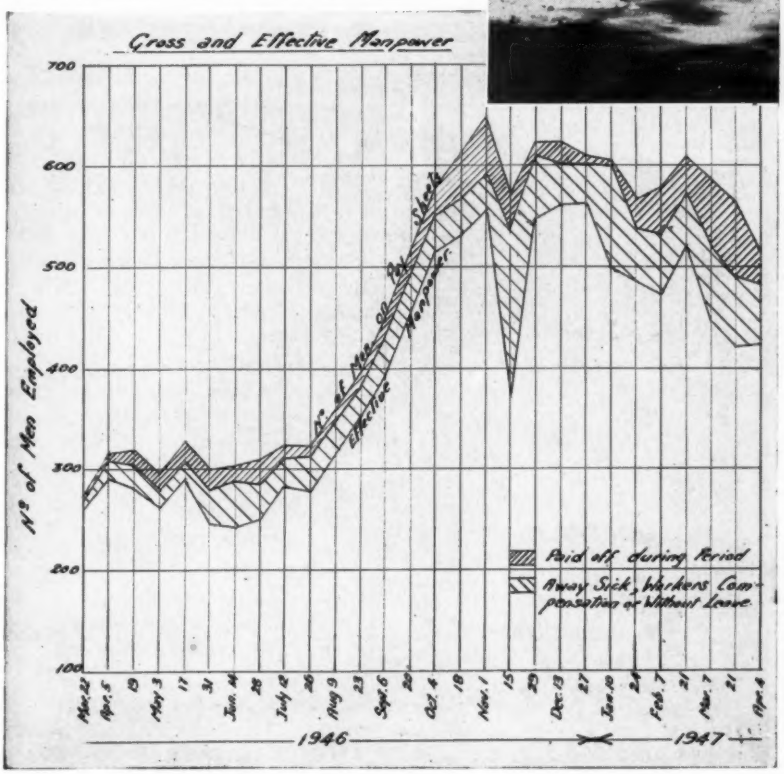
Two 25-year-old steam shovels —a 1½-yd. Ruston No. 10 and a ⅞-yd. Ruston No. 6—owned by



• **Above: The concrete batch plant with truck-fed receiving hopper for aggregates (top) and chutes for loading mix to dump trucks (lower left).**

• **Right: Aggregate was prepared in the crusher plant by a 16x12-in. Jacques Jar crusher powered by a 20-h.p. Southern Cross YEB diesel engine.**

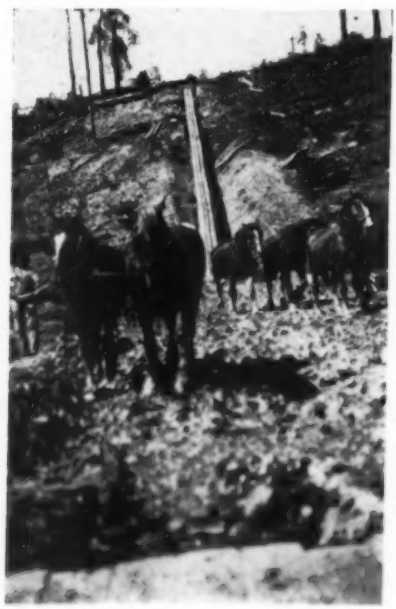
• **Below: Rapidly-fluctuating manpower during the final season was one of the most serious obstacles to early completion of the project.**



• Above: At the pug pit, D. S. Hunt's Ruston-Bucyrus 17-RB diesel dragline loads pug (impervious material) to 5-yd. dump truck . This pit was in a swampy area unsuited to tractor operation.

• Above: Overall view of pit shows 17-RB (right) and Ruston No. 6 steam draglines loading out material for the impervious core of the main embankment.

• Below: "horsefoot rollers" tamping clay into pug core at the site are heavy draft horses.



the Public Works Department excavated fill material in the southeast borrow pits, loading to 5-yd. dump trucks. Wood, cut from the heavily-timbered basin of the dam in 3 and 1½-ft. lengths, was used to fire the shovel boilers. Average production of the shovels was 400 cu. yds. per shift (8 working hours) for the No. 10, 256 yds. on the No. 6 machine. Privately-owned dump trucks hauled material on a piece-work basis. Five were required to haul material from the 1½-yd. shovel, three for the ⅞-yd. machine. Average haul from pit to embankment increased from 2000 feet at the start of the season to 2700 feet as the project neared completion. In all, 55 dump trucks of various makes including Ford, Chevrolet, Dodge and International were used on the project.

Fill in the northeast borrow pit was excavated, hauled, and placed in the embankment by four scrapers—a D-7 Caterpillar-drawn 10-yd. La Plant-Choate C-74, a 12-yd. Le Tourneau LP powered by a Caterpillar D8 tractor, and two International TD-18-drawn 6-yd. Le Tourneau MS scrapers.

When they could be spared from other work, two tractors—an International TD-18 and a Caterpillar D-7—were used as pushers in loading, to draw rooters used to break up the decomposed granite bars, and for dressing the floor of the pit. The Caterpillar rig used Le Tourneau bulldozer equipment and the International carried a Baker bulldozer.

Maintained Downhill Loading

In addition, the two bulldozers prepared new loading levels as the embankment increased in height —at all times keeping a downhill grade between the current loading level of the pit and the top of the embankment. This allowed downhill loading most of the time, lessening the necessity for pushers. It was found that better production levels were maintained without previous rooting, except when necessary to break up rock inclusions. Average production was 321 cu. yds. per shift (8 working hours) for the La Plant-Choate scraper, 351 yards for the large Le Tourneau, and 247 yards for each of the smaller Le Tourneau's. Hauling distances for the scrapers increased from 800 to 2,200 feet as the job progressed.

For short periods, two subcontractors carried on shovel operations in the back portions of the scraper pit. Contractor D. S. Hunt, Perth, loaded an average 390 cu. yds. per shift to five 5-yd. dump trucks with his ⅝-yd. Ruston-Bucyrus 17-RB diesel shovel. Contractor D. S. Rhodes, also of Perth, maintained an average 312 cu. yds, of fill material per shift loaded to four 5-yd. trucks with his ⅜-yd. Ruston-Bucyrus 10-RB diesel shovel.

Average haul from the two shovels lengthened from 1200 to 2700 feet as the job progressed. No explosives were used in either of the borrow pits.

Bulldozer Spreading at Fill

Earthfill from the shovel-excavated borrow pits was dumped

in heaps about 18 feet apart and spread by an Allis-Chalmers HD-7 with Le Tourneau bulldozer in a layer varying from four to six inches thick. Scrapers, working on a different section of the bank than that supplied by the dump trucks to avoid congestion, spread their own loads to about the same thickness.

After spreading, additional moisture was added as required, first by means of hoses connected to pipelines at each end of the bank. When lengthening of the embankment made this method impractical, water was supplied from two 400-gal. FWD water trucks. Tests for moisture content of the fill material were made three times a day.

The fill was consolidated by three sets of sheepsfoot rollers. Two sets of Malcolm Moore twin rollers each four feet wide by three feet in diameter drawn by Caterpillar D-4 and Allis-Chalmers HD-7 tractors, and one single roller built by the department to

• Left: Earthfill spews into a 5-yd. Chevrolet dump truck from the 1½-yd. dipper of Ruston No. 10 wood-burning steam shovel.

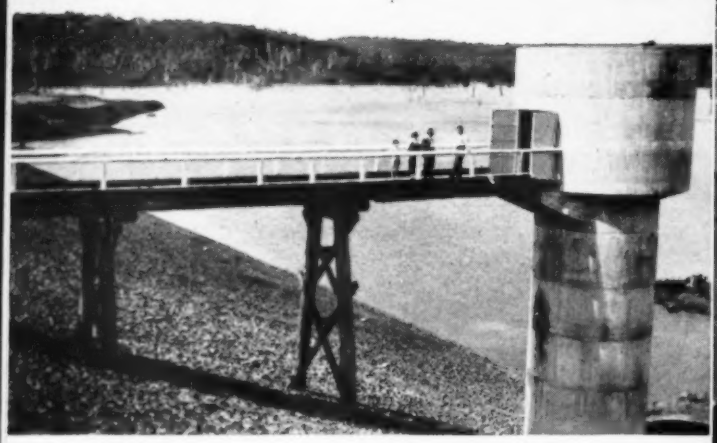
• Below: 10-yd. La Plante-Choate scraper (left) drawn by a D-7 Caterpillar tractor, and two International TD18-powered Le Tourneau 6-yd. scrapers pick up loads in a northeast earth borrow pit.

• Center Left: Photo taken early in the job shows 6-yd. Le Tourneau scraper preparing to spread its load on the embankment as 10-yd. LaPlante-Choate returns to borrow pit.

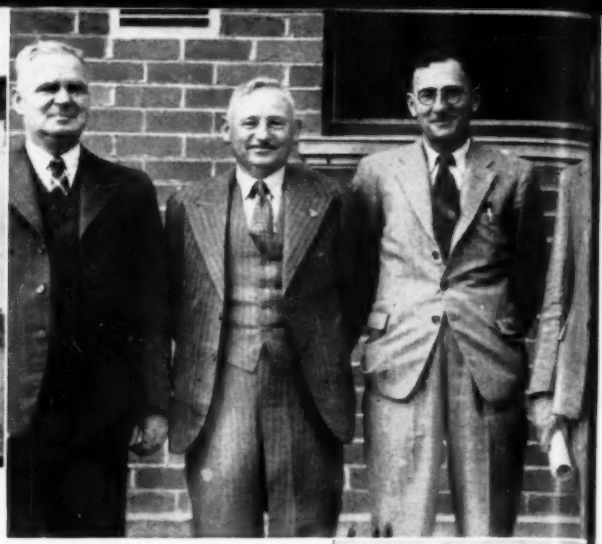
• Center Right: In the northeast section a cat-powered 12-yd. LeTourneau scraper is push-loaded by a TD-18 International tractor with Baker bulldozer.

• Above: Eight to ten passes of the water-filled 3-ft. diameter sheepsfoot's (here drawn by an Allis-Chalmers HD-7 tractor) were required to attain the density specification on the earth fill.

• Above: Early in the final season, truck and tractor equipment starts putting down earth fill on the 850-ft. wide embankment.



• Above: About 350 cu. yds. of concrete were placed in this control tower.



• Above: The author (left) poses with James Lowe, chairman of Harvey roads board, V. C. Munt, construction engineer, and R. A. Macbeth, designing engineer.

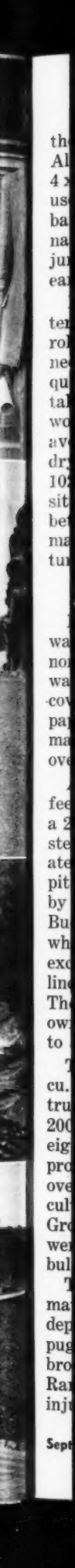
• Below: Control tower is seen at lower right of this view from downstream. Scraper borrow pits are at upper left, beyond the complete embankment. The 1000-acre reservoir is in background.

• Right: The uncompleted concrete spillway as seen from the bywash excavation.

• Below: Diversion tunnel outlet at downstream edge of embankment.

• Below: Upstream face of embankment was finished and control tower (center background) under construction in September of last year.

• Below Right: Photo also taken last September shows completed road on crest of bank, water in reservoir at R. L. 470—48 feet below overflow level.



the same dimensions were used. All were water-filled and carried 4 x 2-in. feet. The latter unit was used to compact the edges of the bank where it blended into the natural slopes, and also for the junction of the pug core and the earth fill.

Depending upon the class of material being consolidated and the rollers used, 8 to 10 passes were needed to obtain the density required. Density specimens were taken daily from areas being worked. Granitic material used averaged 106 to 108 lbs./cu. ft. dry density, and dioritic material, 102 to 104 lbs./cu. ft. Actual densities in the embankment ranged between those of the two principal materials, depending on the mixtures put down.

Pug from Swampy Area

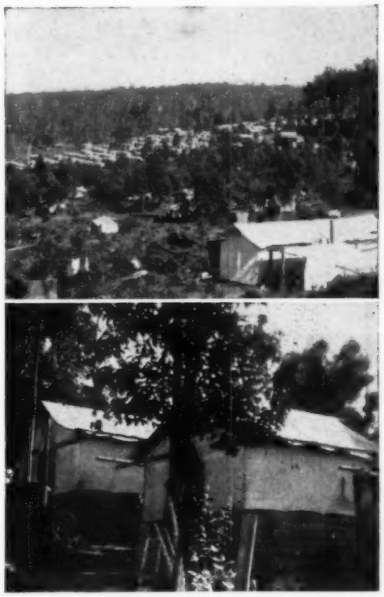
Pug for the impervious core was obtained from a pit two miles northwest of the damsite. This pit was located in a swampy area covered by heavy red gum and paper bark trees with approximately two feet of overburden overlying the pug.

Available in depths up to 12 feet, pug was at first excavated by a 25-year-old ⅞-yd. Ruston No. 6 steam dragline previously operated as a tree puller in clearing the pit area. This rig was later joined by Contractor Hunt's Ruston-Bucyrus 17-RB diesel machine which was transferred from earth excavation and fitted with dragline front end and ½-yd. bucket. These machines stripped their own overburden and loaded pug to 5-yd. dump trucks.

The steam rig loaded about 130 cu. yds. per shift to four 5-yd. trucks, the diesel unit maintaining 200 cu. yd. production loading to eight trucks. Trucks made an approximate 4-mile round trip haul over very steep grades and a difficult approach to the pug mill. Ground conditions in the pug pit were too boggy to permit use of bulldozers.

Trucks dumped the impervious material onto a grate above the departmentally-designed and built pug mill where large lumps were broken up by hand-held Ingersoll-Rand pneumatic spades to prevent injuries to mill rollers. The mill was powered by a 45-50-h.p. McDonald "Super" diesel engine. After passing through the mill, processed pug was loaded directly to other 5-yd. dump trucks which hauled to the site.

This material was spread in the core by an International TD-18 tractor with Baker bulldozer in 4 to 6-in. layers and then watered to an optimum moisture content of 35%. Pug was consolidated by a team of six heavy draft horses on each shift.



• Top: General view of camp area with married quarters in foreground, tents for single men in background.

• Above: Staff tents for single men were 10x12 ft. wooden-floored and timber-framed.

Gravel Pit Work

Gravel for the embankment obtained from pits near the pug pit, occurred in pockets of varying thicknesses ranging from two to six feet and was interspersed with hard ironstone (low-grade siderite) conglomerate which made excavation difficult. Early in the season, gravel was excavated by a bulldozer which loaded dump trucks by means of a ramp.

After completing their work in the pug pit, the steam and diesel draglines were transferred to the gravel pit where they produced about 276 and 396 cu. yds. per shift, respectively. Later, the ⅜-yd. 10-RB machine was brought from the bywash excavation to load about 336 cu. yds. of gravel per shift. Best performance of the bulldozer was 249 cu. yds. per shift. Average haul distance from gravel pits to the embankment was two miles.

Natural ironstone lumps for facing the upstream face of the embankment and for the downstream rock fill, were culled from hills within a 6-mile radius of the dam loaded by hand by private truckers and brought to the dam on a piece-work basis. The best shift output per truck with one helper was 25 cu. yds., and the average was below 20 cu. yds. Over 35,000 cu. yds. of this stone were used for the dam.

Cut Bywash Through Granite

Excavation of the bywash (spillway channel) in the granite hill which forms the south abutment of the dam presented a continuous problem. Originally designed for a width of 70 feet, the channel was deepened to a maximum 55 feet during the middle part of the season and finished to a 40-ft. width. This change in design required less excavation to give the same hydraulic characteristics and therefore served to speed up the bywash operation.

Due to the possibility of heavy summer rains which sometimes occur in this area when summertime northwest monsoons digress to the south, plans called for early plugging of the river diversion tunnel below the dam to allow construction of control gates. Since the river diversion tunnel could not be plugged until a pilot channel had been driven through the bywash, a 20-ft. gullet was the first objective. This increased the congestion, but was unavoidable under the circumstances.

The completed channel involved excavation of some 70,000 cu. yds. of material. Approximately 40,000 cu. yds. was loam and clay of granitic and dioritic origin, a portion of which was found suitable for embankment fill. The balance of 30,000 cu. yds. was hard decomposed and solid granite traversed diagonally by two hard diorite seams.

Loam and clay were loaded out

(Continued on page 45)

Pioneering Begins at Home

• Here is the "after" look — after Reagan earthmoving equipment did plastic surgery on 14 acres of semi-wilderness. The smooth level foreground was formerly a high thickly-brushed hill and the background a deep ravine.

Buy a hill and a ravine, mix them up thoroughly, and smooth out—that's the W. M. Reagan & Sons, Inc. recipe for converting a long neglected "jungle" spot into valuable real estate—and incidentally providing fill-in work for men and machines.

• Below: Harry C. Reagan (right) is shown with two veteran Reagan employees. In the center is Foreman W. L. Hunter, while at the left is Parker Emmons, shovel runner.

BOTH parties to a 150,000-cu. yd. excavating and earthmoving "contract" were the same person on a job recently completed in West Columbia, South Carolina. The dual role was played by Harry C. Reagan who, as secretary and manager of the Columbia contracting firm of W. M. Reagan & Sons, Inc., purchased 14 acres of semi-wilderness and put his men and machines to work leveling and grading the tract, principally during slack periods.

About half the acreage consisted of a 60-ft. hill, the other half was a ravine just as deep as the hill was high, and both were thickly covered with brush and saplings — a combination of circumstances that kept the land unused, largely unwanted, and consequently available for purchase at a nominal price.

For the Reagan firm, however, this land offered a number of desirable possibilities. Leveling of the tract would serve beautifully to keep men and machines active between jobs, at the same time benefiting the firm by enhancing the value of the land itself and providing extra equipment-storage space.

In addition, such a project would provide a chance to demonstrate Reagan equipment and methods—a constant reminder to the populace that W. M. Reagan & Sons, Inc., is outstanding among earthmovers. Harry Reagan recognized these possibilities, bought the land in mid 1947, and soon had equipment busy pushing the hill into the ravine.

Since the job was of a fill-in nature, no set line-up of machines was assigned to the work. Units were used only when they were not busy on other jobs. As time went on, almost every piece of Reagan equipment saw service on the project. About 100,000-cu. yds. of the total were moved by various combinations of bulldoz-

ers and tractor-drawn scrapers.

In all, six bulldozers and three scrapers were used. The bulldozers were LeTourneaus, four of them mounted on Caterpillar D-6 tractors and two of them on D-7's. The scrapers were 8-yd. LeTourneaus pulled by D-7's.

The remaining 50,000 cu. yds. of dirt was loaded to varying numbers of International K-5, D-35, and K-10 trucks equipped with 3 to 6-yd. St. Paul dump bodies. The digging was done by a Bucyrus-Erie 22-B diesel dragline equipped with a 35-ft. boom and 1-yd. bucket.

Large Boulders Appear

The biggest single problem that arose was one which had been totally unexpected. As the scrapers, bulldozers, and dragline proceeded with chopping off the steep hill, huge granite boulders began to appear. It was later determined that the boulders represented between six and seven thousand yards of rock.

The obvious solution, of course, was to drill them with jackhammers and blast them down to movable size. There was a little matter of an ordinance against blasting within the city limits, however, and consideration of other methods was in order.

The sidewalk superintendents gave vent to great murmurings about doing things the hard way when the 22-B, with crane front end, was set to work breaking up the boulders with a 4000-pound drop ball. Their comments stopped abruptly when they saw boulder after boulder quickly broken up into pieces which the bulldozers easily pushed out of sight into the ravine fill.

• Erected by the Reagan company especially for employees, these cottages were the answer to perplexing employee housing problems.

Thorough Drainage Provided

To provide for drainage of the area, several lines of 48-in. concrete pipe were put in: a double line 400 feet long and a single 650-ft. line. The lines were set about two feet apart and 18 feet below the final grade. The pipe sections were placed by the 22-B crane.

Long before the work was completely finished, the wisdom of the project became self-evident. Besides paying off in providing uninterrupted work for key personnel, the job quickly brought forward a road machinery equipment distributor interested in buying a segment of the improved land for a location for his office building and shop. The Reagan firm obliged by selling him a 2½-acre strip in the middle of the tract. The distributor has already erected his building and is doing business at the new stand.

The regular work for which this job served as fill-in is described by Harry Reagan at "50% road work, most of which is handled on sub-contract, and 50% small jobs for individuals and companies—such things as basements, grading, etc."

For handling these jobs, the Reagan company has the two excavators mentioned earlier, six tractors, three scrapers, and some 35 International trucks. Harry Reagan very definitely leans toward having plenty of trucks available on every job. He believes in "keeping the shovel swinging" by means of steady on-time truck spotting.

"Theory of the Waiting Truck"

To a job generally considered a 10-truck job, the Reagan organization assigns twelve trucks so

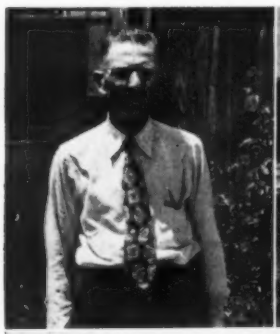
• The 22-B dragline above digs a berm ditch for a new highway. Low overhead wires required working the 35 ft. boom at a low angle.

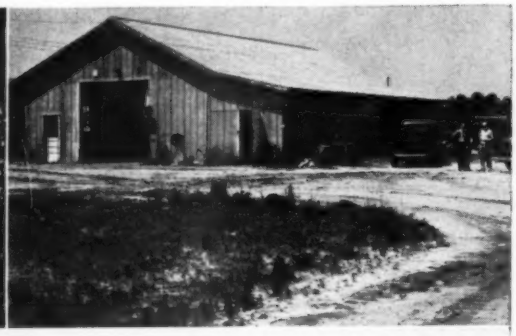
• Dirt from the berm ditch is deposited on the roadway where it will later be spread by a bulldozer.

that 10 will be constantly in service, while one is being maintained and the other is kept ready as standby. This "theory of the waiting truck," the company feels, has done much to increase their production.

At the time of the writer's visit in May, the principal job in progress was a roadwork stint consisting of digging a 1¾-mile berm ditch for a new strip of highway just out of Columbia, and grading and cleaning the road shoulders. For the ditch work, they used the Bucyrus-Erie 22-B with 35-ft. boom and a 1-yd. Hendricks dragline bucket. Low telephone wires hampered operations somewhat by forcing a low boom angle, but nevertheless the machine was averaging 600 yards a day in fairly hard digging. The entire ditch job was estimated at 6000 cu. yds.

Dirt from the ditch was dumped on the shoulders by the dragline and a Caterpillar D-6 tractor with LeTourneau bulldozer used the dirt to build proper slopes.





• Top Left: Bookkeeping for W. M. Reagan & Son, Inc. is handled by W. G. Tench.

• Top Right: All Reagan equipment is thoroughly checked at regular intervals. Maintenance is handled at this shop.

• Above: Trucks are kept outside to reduce the hazard of fire but are carefully protected from weather.

• Below: The truck at the right is a veritable service station on wheels. It carries air, grease, oil, and gasoline — all operated under pressure — to machines on the job.

Concern over the welfare of personnel is a tradition in the Reagan organization. When housing problems arose for some of the men, the company promptly built four cottages on the grounds of its yard, and the men moved their families in. The organization has found that right treatment of personnel pays off in the quality of the work turned out.

Machine operators consider their machines their "babies" — so much so that they're anxious to handle the servicing work. The Reagan company makes it worth their while, too, for it pays the men their regular operating rate for servicing time spent. The result is that operators keep equipment in top operating condition.

To make the servicing job faster, better, and easier, the Reagan company has three special service trucks which are literally "service stations on wheels." Each truck is equipped with air, grease, lubricating oil, fuel oil, and gasoline—all pressure-operated. With such facilities it's easy to keep all machinery serviced promptly, properly, and regularly — which means avoidance of serious machinery breakdowns on the job.

Between jobs, shovels and other equipment are given thorough inspection to find wear spots or other indications of impending trouble. Whatever is found is quickly corrected.

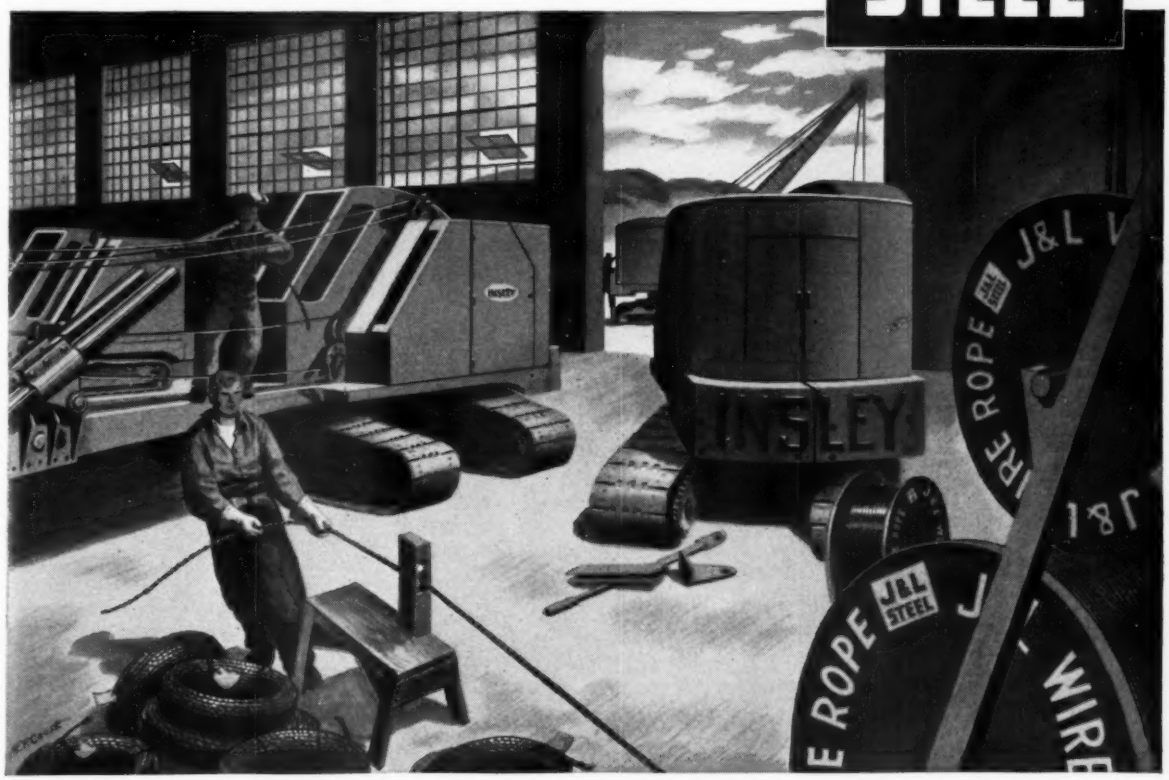
Equipment Always "Well Dressed"

Machine appearance is considered important, too. All rigs are constantly slicked up and periodically painted. Trucks are kept outside to reduce the hazard of fire, but they are carefully covered to protect them from the weather.

As mentioned earlier, Harry C. Reagan is the active head of the company, which was established by his father, W. M. Reagan, who relinquished the company reins upon reaching advanced years. Working under Harry as foremen are W. L. Redd and W. L. Hunter. Accounting is handled by W. G. Tench. Fourteen key men form the organization's nucleus, to which extra labor is added as required.

INSLEY standardizes on **J&L** Wire Rope to help operators dig more profits

J&L STEEL



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Insley—the world's largest exclusive manufacturer of small excavators—has standardized on J&L Wire Rope, because more and more operators demand equipment that will *stay on the job!* Insley knows that when excavators go down for wire rope replacements, operators' profits go down too.

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Field NOTES

Hydraulic System Maintenance

A number of different types of hydraulic control systems are now in use. Certain maintenance precautions apply to all units of such equipment. Proper grade of oil should be used. Fluid level should be checked periodically so that proper level is maintained. Oil filters on hydraulic systems should be serviced frequently to insure against dirt or other foreign matter entering the system. Keep air breathers open and clean. Use the grade of oil recommended by the manufacturer.

On all hydraulic control systems, it is extremely important to maintain the proper fluid level. A low hydraulic fluid level may result in air being drawn into the system, thus causing foaming and faulty operation. If too high a level is carried, improper valve action may result, and oil may be forced out of the system through the breather.

Where excessive foaming is experienced, it may be necessary to drain the system completely.

For extremely low temperatures, it may sometimes be necessary to dilute the hydraulic fluid with up to 10% of kerosene. The diluted fluid should be removed from the system and replaced with heavier oil as soon as warmer weather is encountered.

Courtesy Gulf Oil Corporation

Easy Sheet Metal Cutting

Sheet metal or corrugated iron can easily be cut with an ordinary hand saw, provided the gauge of the metal is not too thick. Here's how to go about it:

Get two two-by-fours, straight ones if possible, and with sharp corners. Put a shim of cardboard, about the thickness of the saw blade, between the ends of the two-by-fours; then nail the ends together, flatwise. Lay the metal to be cut on this jig. With the back of the saw against the metal, work in a manner similar to operating a can opener.

The method is much simpler than cutting with a tin shears and does not leave bent places in the metal which must later be flattened out.

Vollie Tripp

Welding Tips

A B Cs of Straight Line Cutting

Adjust the preheat flames to neutral after you have selected the right size nozzle and cutting pressure for the plate thickness (See the instruction folder for the blowpipe you are using). The inner cones of the preheat flames should be from 3/16" to ¼" in length when cutting the oxygen valve is open. Hold the blowpipe in your right hand to keep constant control of the cutting oxygen lever.

Balance the blowpipe on your left hand. You can either hold the blowpipe or rest it on your closed fist. Move the blowpipe rapidly along the line of cut to make sure there is enough slack in the hose. Freehand cutting usually is done from right to left. To preheat, hold the blowpipe with the nozzle vertical. The tips of the inner cones should be close to but not quite touching the plate. Center the tips over the edge of the plate on the line of the cut. Preheat a spot until it is a bright red and just starts to melt.

Cutting will start when you slowly press down the cutting-oxygen lever. There will be a shower of sparks from the lower side of the plate. When the cut has started all the way through the plate, move the blowpipe forward slowly at a constant speed. The cut should continue to go through the plate without too much oxidation or melting. At the right speed, the stream of sparks will be directed vertically toward the floor.

Don't lose the cut. If you move the blowpipe too fast, the cutting jet will not go through the plate and cutting will stop. When this happens, release the cutting-oxygen lever at once. Reheat the point where the cut stopped to a bright red. Then open the cutting-oxygen valve and restart the cut. When the cut is finished, the cut piece should drop free, but slag sometimes holds the two pieces of plate together. A sharp rap with a hammer will separate them.

Courtesy Linde Tips, Linde Air Products Co.

Motor Vehicle Fire Prevention

The following ten fire hazards from improper motor vehicle upkeep are the principal reasons for fires in trucks, automobiles, tractors, according to NFPA fire record studies:

1. Failure to maintain fuel system integrity and improperly adjusted carburetor.
2. Electrical system wear causing short circuits.
3. Battery cable and case deterioration.
4. Improper lubrication of engine and other moving parts.
5. Exhaust pipe and muffler corrosion.
6. Excessive spillage or seepage of oil and grease on engine and chassis.
7. Failure to maintain spark plugs, distributor wiring, and the prevalence of electrical sparks across exposed terminals.
8. Radiator and cooling system leaks during winter months (alcohol anti-freeze solutions).
9. Brakes covered with grease and oil.
10. By-passing of fuses in the electrical system.

Here are a few steps to take in case of a motor vehicle fire: Turn off ignition (disconnect battery as well as turning off ignition switch on dashboard wherever possible). Attack the fire with a hand extinguisher from the windward side and from the outside of the vehicle. If the fire is in the engine, it is generally necessary to raise the hood (if possible) and to apply the extinguishing agent to the base of the fire. If the hood cannot be raised, aim the extinguisher stream through the louvres. If the fire originates from a fuel tank leak, put out the fire closest to the tank first. If the fire is in the upholstery, saturate the area thoroughly and make sure no hidden sparks remain. If a tire is afire, it is usually necessary to remove it or apply large quantities of water. Thoroughly air the vehicle following complete extinguishment. If the fire was in the engine, do not re-start the engine until the cause of the fire has been eliminated.

Courtesy N.F.P.A. Handbook of Fire Protection.

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P&H 1055 owned by Lytle-Amis-Green at Potholes Dam, Columbia River Irrigation Project. Nine million yards of rock and dirt will make this the 4th longest dam in the U. S.

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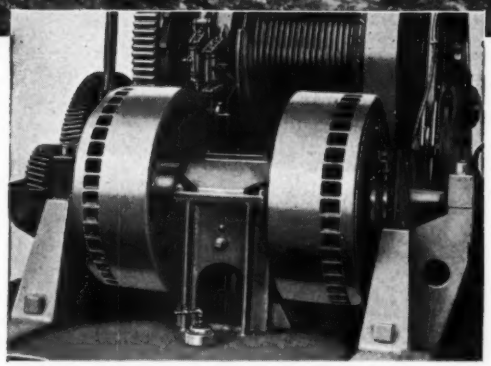

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Shots from the FIRING LINE

Over $500 Million Road Work Placed in 6 Months

More than half a billion dollars worth of road work was placed under contract by State highway departments during the first six months of the year. Reports received by the Public Roads Administration of the Federal Works Agency show that projects having a total construction cost of $568,091,000, for improvements on 21,714 miles of primary and secondary roads, were let to contract between January 1 and June 30.

Federal-aid projects involving work on 10,439 miles of road accounted for $346,788,000 of the total. The Federal contribution amounted to $184,723,000. Contracts awarded by State highway departments for work financed without Federal assistance called for a total expenditure of $221,303,000 for improvements on 11,275 miles of road. Projects included three bridge construction jobs for which contracts were awarded by special toll authorities: Delaware River bridge, $11,401,000; Mystic River bridge in Massachusetts, $13,282,000, and the Tacoma Narrows bridge in Washington State, $11,197,000.

Pennsylvania, with a total of $71,359,000, led the States in the dollar-volume of contracts let in the six-months period. California was second with a total of $36,950,000, and Texas third with a total of $30,342,000. In total mileage of road improvements contracted for, Texas was first with 2,400 miles; Ohio second, with 1,637 miles, and Pennsylvania third, with 1,208 miles.

Federal-aid projects consisting of improvements on 5,909 miles in the Federal-aid primary and secondary road systems were completed in the first six months of the year at a cost of $221,336,000 of which $112,725,000 was Federal funds.

Chicago Safety Meeting

The 36th National Safety Congress and Exposition, sponsored by the National Safety Council, will be held in Chicago from October 18 through October 22. Five leading hotels will house the safety sessions and expositions: Stevens hotel, for the industrial safety exposition and industrial sessions; Sherman hotel, for the public safety exposition and traffic, farm, home and women's safety sessions; Morrison hotel, for industrial and school and college sessions, and Congress and La Salle hotels, for industrial sessions.

New Binkley Officers

The board of directors of Binkley Coal Company and Pyramid Coal Corp., with headquarters in Chicago, has announced the election of Hubert E. Howard, Sr., as chairman of the board, and Rantz E. Snoberger as president.

Plan Penn. Turnpike Re-Financing for Extension

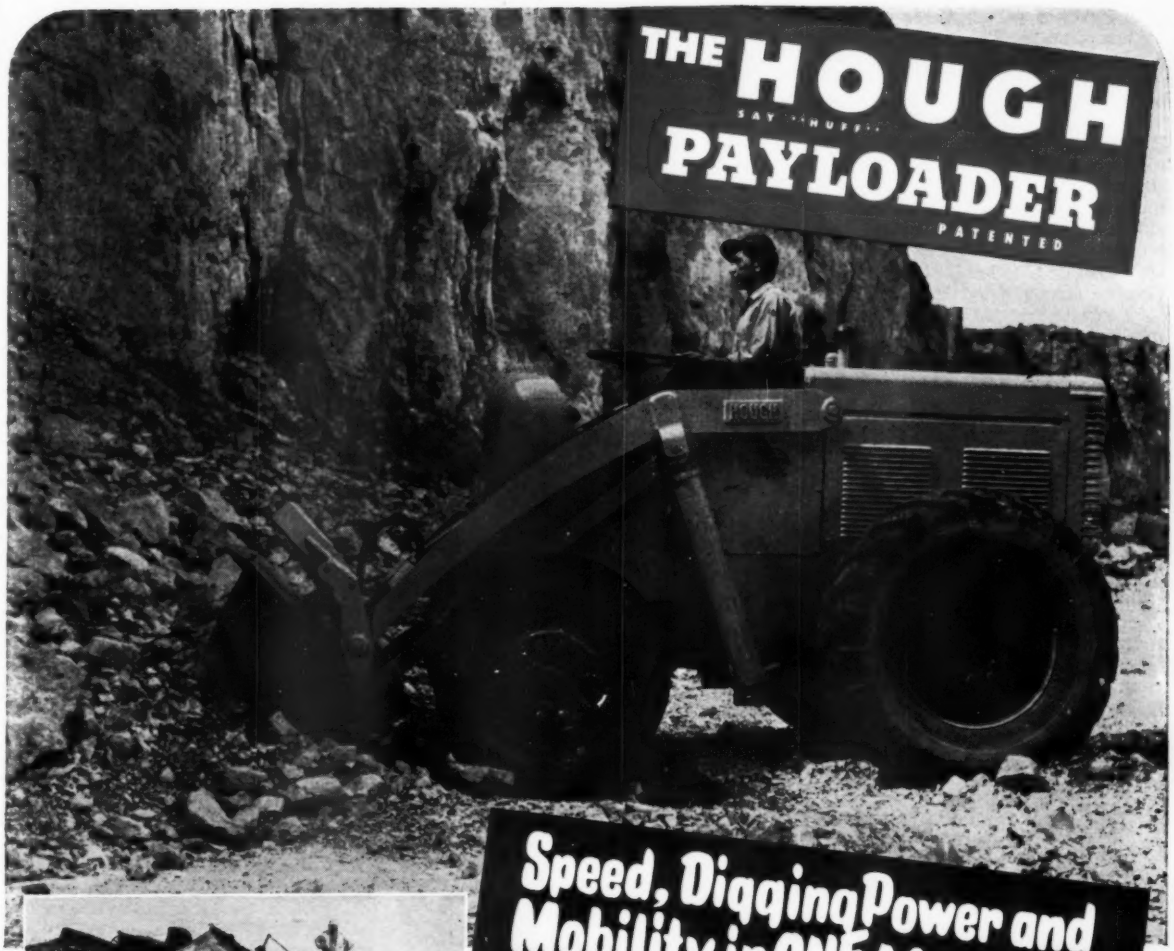
Cost of the 100-mile Philadelphia extension of the Pennsylvania Turnpike will approximate $87,000,000. Funds from private investors will finance construction of the extension of the toll superhighway from its present eastern terminus at Middlesex, Cumberland County, to King of Prussia, Montgomery County.

T. J. Evans, chairman of the Pennsylvania Turnpike Commission, announced that final details of the financial arrangements were being worked out by a syndicate headed by Drexel and Co., B. J. Van Ingen and Co., Inc., Blyth and Co., Inc., and the First Boston Corp. Plans call for consolidation of all Turnpike financing in a bond issue totaling $134,000,000.

This new bond issue would permit refunding by 1951 of the presently outstanding bonds in the amount of $45,086,000 and provide funds for construction of the Philadelphia extension, the cost of retiring the old bonds and issuing the new ones.

Evans said that $47,000,000 of the new issue would be in relatively short-term bonds which are to be retired

• Advocates of the St. Lawrence seaway are currently pointing out the potential defense value of the proposed deep-water passage from Duluth, Minnesota, to Montreal, Quebec, Canada. The passage would permit ocean going vessels to enter Great Lake ports. Potential destroyer and cruiser building facilities are shown by shapes in white. A power project is also proposed to supply electric power to adjoining states. Authenticated News photo.



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serially over a period of years, probably less than 20. The remaining $87,000,000 probably will be of the 30-year maturity type. The bonds will be amortized through the collection of tolls for use of the superhighway.

Contracts for core drilling along the entire route of the 100-mile Philadelphia extension, and for engineering design and plans for about 24 miles of the new link have already been awarded.

The original 160-mile Pennsylvania Turnpike stretch from Irwin, 20 miles from Pittsburgh, to Middlesex, cost more than $70,000,000. It was opened Oct. 1, 1940.

Governor Duff has directed the State Highway Department to prepare plans for a new, free highway from King of Prussia to Philadelphia to carry the Turnpike traffic in and out of that city. This free highway, unlike the Turnpike, will be financed entirely by the state from its motor fund. Plans for the major traffic improvement in Philadelphia are being worked out by state and city authorities.

Complete Excavation for Oakland, Calif., Freeway

by Mark McMillin

The excavation phase of the $900,000 Eastshore Freeway at Oakland, California has been completed. The freeway, when finished will be one of the most heavily traveled roads on the Pacific Coast—an artery of rapid transit through Oakland and the other Eastbay cities to the San Francisco-Oakland Bay Bridge.

Approximately 890,000 cubic yards of hydraulic fill were pumped into the roadway section from a borrow area in San Francisco Bay (about five miles from the project) after 300,000 cubic yards of saturated marshland mud had been excavated from the roadway site and placed to form dikes to confine the hydraulic fill.

Johnson Western-American Contractors, used three 1.5 cubic yard floating clamshell dredges to excavate along the freeway. The excavation is 100 feet wide at the bottom, and the side slopes are 1½ to 1. The cut is approximately six feet on an average.

Dry Material Before Placing

Because of the danger of slips into the excavated section, the excavated mud and clay were placed five to ten feet out from the top of the cut and allowed to dry out thoroughly before being shaped into levees. At the beginning of the freeway site the native material was made up largely of adobe. The next section consisted of tidal marshes, and some clay loam was encountered.

In the final area—that of a tidal marsh—the soft bluish mud varied in depth from four to ten feet, with an average depth of five or six feet. Underlying this mud is a layer of clay, interspersed with some gravel and sand strata in isolated places.

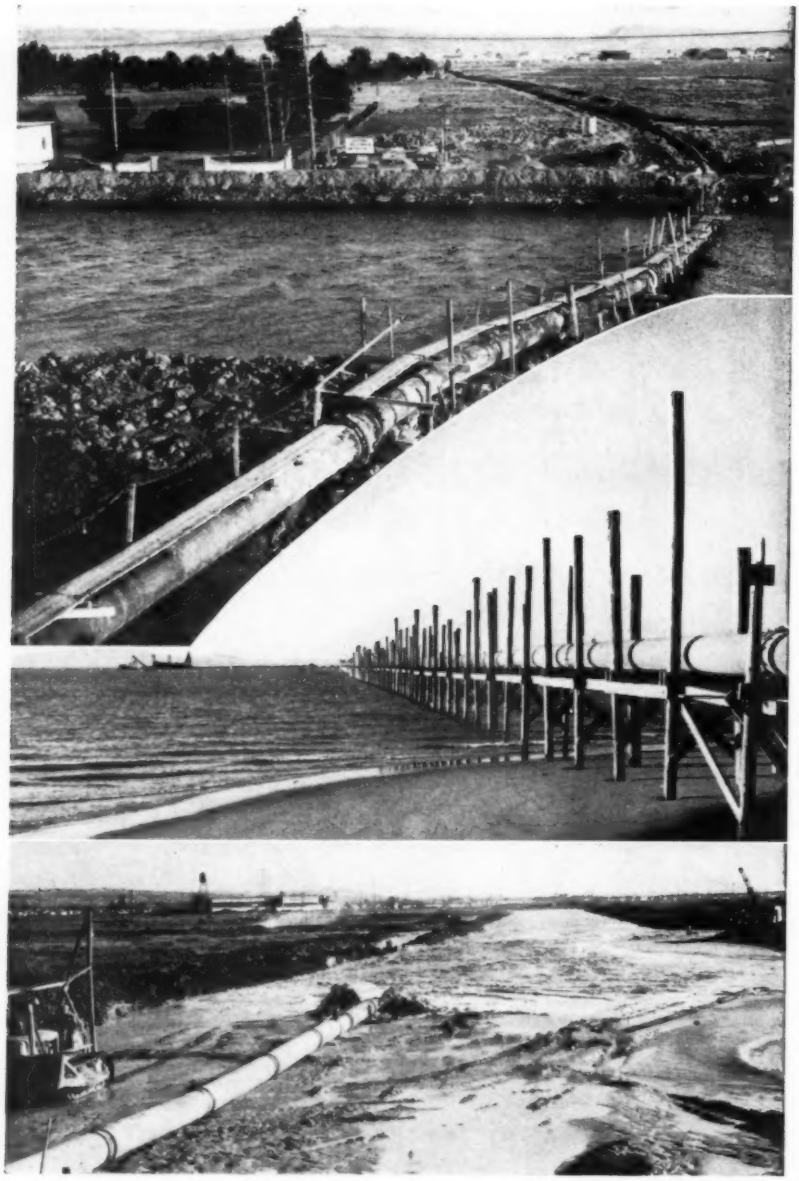
Dredging on the project was done by the dredge "Olympia" which was completely rebuilt in 1945. The wooden frame hull measures 150 by 40 by 13 feet, and draws nine feet of water. The digging was done by a 5-blade basket-type Symon cutterhead 6.5 feet in diameter, at the end of an 86-ft. ladder. The average depth was 28 feet. A 40-ft. "A" frame guyed to a 50-ft. gallows supported the ladder.

The pump has a diameter of 76 inches and a 2500 h.p. motor. A booster pump on the dredge "Papoose" pumped the dredged material to the site of the fill, approximately 25,700 feet from the dredging area. A radio telephone was used for communication between the booster pump and the dredge, while a telephone line connected the booster pump and placement area for emergency use.

Six-Lane Construction

Because of the fluidity of the excavated material, it was necessary at all times to patrol the levees which con-

(Continued on page 30)



• Top: Looking south from the booster pump dredge "Papoose" toward the freeway where the 30-in. dredge line passes near the Alameda Municipal golf course (top left of photo).

• Center: Timber trestle carries 30-in. line from the 24-in suction dredge "Olympia" (background).

• Bottom: Sand and water discharges on embankment from 24-in. outlet pipe. The RD-6 Cat-mounted Le Tourneau bulldozer (left) is used to move dredge pipe and to reinforce the retaining levee.

To the blasting engineer who has yet to use Primacord-Bickford Detonating fuse

You're interested in getting good fragmentation . . . to keep digging costs down, yardage up.

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1. In normal hook-up, Primacord Detonating Fuse extends the full length of the hole, and — being in contact with every cartridge — it initiates the *entire* charge at *maximum* power.

2. Primacord can be hooked up so that front lines go a split-second before succeeding lines. This relief of burden promotes better fragmentation, and reduces the need for secondary blasting.

3. Primacord reduces hazards because it is a non-conducting material, insensitive to stray electrical currents. It is, therefore, the practical detonator for use on jobs with high-voltage equipment.

4. Simplicity of the Primacord hook-up method of square knots and half hitches cuts down loading time.

5. Primacord is made in grades to meet every blasting condition, and packed on easy-to-handle spools. P-8

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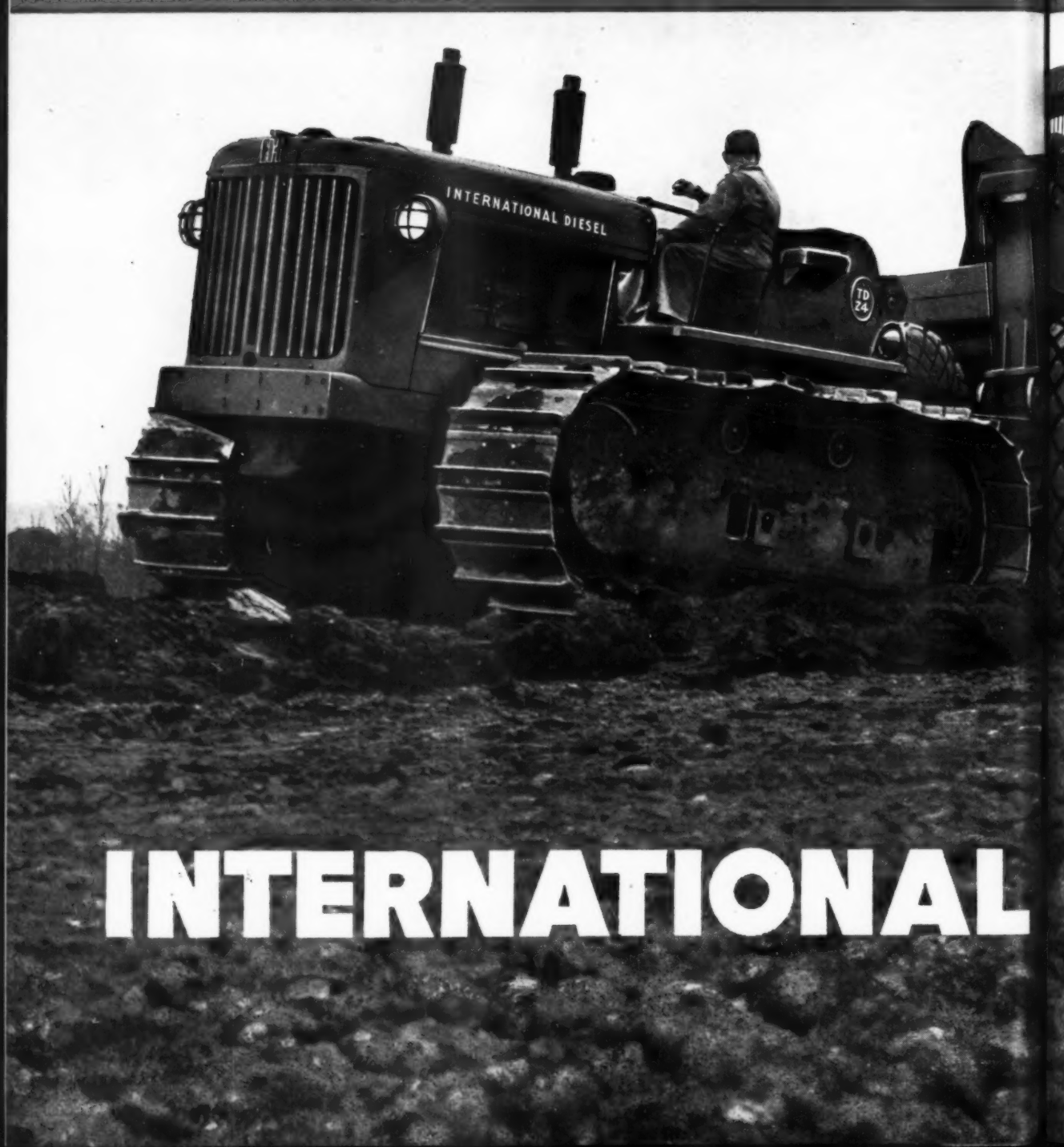

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Industrial Power

Shots

(Continued from page 26)

tained the dredger fill, and to use draglines and tractors with bulldozers in reinforcing the weak spots as they developed. The final shaping of sand fill to planned section was done by Caterpillar D8 tractors and 12-cu. yd. Le Tourneau scrapers. The embankment, when completed will provide for a six-lane highway.

The project also called for the construction of many small ditches to replace disturbed water courses and to provide drainage. Larger ditches were excavated at Elmhurst Creek, Damon Slough, and East Creek Slough, and bridges will be built over these waterways. Contracts for these bridges were let in April to E. H. Peterson and Son of Richmond, California, for $248,249.

Also awarded on the same date was a contract to Fredrickson & Watson Construction Company of Oakland, for $1,373,333 for grading and paving the Eastshore Freeway bewteen 38th Avenue and Oak Street in Oakland.

Personnel on the job includes C. McCoy, dredging superintendent, and L. J. Sullivan, general superintendent for the Johnson Western-American Company. General supervisor for the project is Joseph H. Skeggs, assistant state highway engineer. The direct supervisors are R. P. Duffy, assistant district engineer, operations, and F. W. Montell, resident engineer.

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Construction Soars to All-Time 6-Month High

Investment commitments for construction in the thirty-seven states east of the Rocky Mountains soared to $4,766,795,000 in the first half of this year to set an all-time dollar record for a first-half period, according to the F. W. Dodge Corporation. The previous record for a first-half period was $3,937,736,000—established in 1946.

Contract volume in the first six months of this year was 36 per cent higher than that reported for the corresponding period of 1947. The greatest gains were in nonresidential building, which showed a rise of 60 per cent. Residential awards were 24 per cent higher than in the first half of last year while heavy engineering works showed a gain of 26 per cent.

As compared with the first half of last year, the gains in the Dodge corporation's fifteen reporting regions were 25 per cent or more, except in New England where the gain was 13 per cent, Texas, with a gain of 18 per cent, and southwestern Ohio and Kentucky where a decline of 4 per cent was reported.

Areas in which volume gains exceeded the average for the thirty-seven eastern states combined were: upstate New York, up 79 per cent; Southeastern states, up 44 per cent; northern Illinois, Indiana, Iowa, Wisconsin and northern Michigan, up 58 per cent; Louisiana and Mississippi, up 48 per cent; Minnesota, North Dakota and South Dakota, up 40 per cent; western Missouri, Kansas, Nebraska and Oklahoma, up 79 per cent.

Investment contracts for residential building in the first half of the year totaled $1,823,569,000 in the thirty-seven eastern states while nonresidential contracts amounted to $1,859,653,000. The six-months total for heavy engineering awards was $1,083,573,000.

Announce Distribution of New Engineers Corps Funds

The Corps of Engineers' flood control and river development program in the Missouri Basin will hit a new construction peak in the fiscal year 1948-49, according to Maj. Gen. Lewis A. Pick, Missouri River Division Engineer. The $90,000,000 appropriation for Missouri Basin work passed by Congress and signed by the President June 25, will enable the Corps to speed up work on 40 flood control and river channel projects in the 12 months ahead.

This third year of construction will see the entire Pick-Sloan plan for comprehensive basin development move well along the road toward accomplishment as authorized by Congress in the 1944 Flood Control bill, Pick said. General Pick is chairman of the Missouri

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The Hartop series consists of four types of electrodes — with Rockwell C hardness ratings as follows: Hartop Brown, 35 to 40. Hartop Green, 45 to 50. Hartop Red, 50 to 55. Hartop Yellow, 58 to 63.

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Basin Inter-Agency Committee which is coordinating the basin-wide program.

Here are Corps projects for which new funds were provided by Congress:

Garrison Dam on Missouri River near Garrison, S. D.—The $26,000,000 appropriated for this project will permit letting a contract for stage 2 of the main embankment of the dam. This will call for placing and compacting 56,000,000 cubic yards of earth on the dam, placing 75,000 feet of sheet piling, placing 700,000 cubic yards of protection rock on the up-stream side of the dam and diverting the river through the tunnels.

Fort Randall Dam on the Missouri near Lake Andes, S. D.—Appropriation $18,000,000. This will permit full speed ahead on an existing continuing contract for the first portion of the earth embankment and initiation of work under a new contract to be awarded this fall for placing the main embankment, expected to be completed in 1952.

Harlan County Reservoir on Republican River near Republican City, Neb. —Appropriation $8,000,000. All funds will be applied on existing contracts for completion of the dam and spillway, scheduled for the fall of 1951.

Cherry Creek Dam on Cherry Creek near Denver.—Appropriation $7,000,000. It will permit continuation of work under existing contract for completion of the earthen dam and outlet works, with substantial completion of the project expected by the fall of 1949.

Oahe Dam on Missouri River near Pierre, S. D.—Appropriation $2,000,000. Contract will be let this summer for starting this project with construction of access highway from Pierre to dam site, also for initial housing and administrative facilities.

Gavins Point Dam on Missouri River near Yankton, S. D.—Appropriation $250,000 for advanced planning preliminary to start of actual construction which it is hoped can get under way in 1950.

Omaha Flood Control Works.—Appropriation $2,400,000. Will permit completion of existing levee construction contracts and award of new contracts for interior drainage.

Council Bluffs Flood Control.—Appropriation $886,000. Will allow completion of the Council Bluffs levee project if required rights of way are fully provided.

Kanopolis Dam on Smoky Hill River in Kansas.—Appropriation $48,000. Funds will be used for finishing up the work on this project which was substantially completed and dedicated in May.

Kansas City's Flood Control Works. —Appropriation $7,000,000. Permits continuance of work under existing contract for a levee around the Northeast Industrial District of Kansas City, Mo.; will essentially complete the Liberty Bend cutoff project just below Kansas City, cutting off a sharp bend in the river and reducing flood heights at Kansas City; will permit continued work on a 4-mile levee and floodwall

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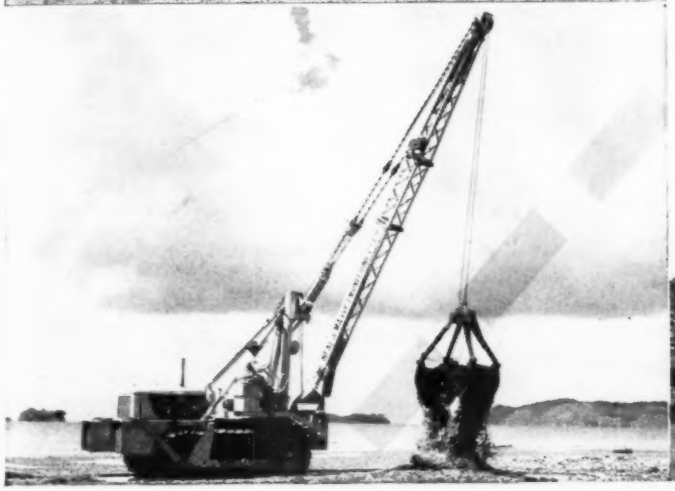

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extension up the east bank of the Kansas River from the mouth at the Missouri, will permit a start on the Armourdale levee project on the west bank of the Kansas between the Kansas Citys and will permit continuance of work on interior drainage within North Kansas City levee.

Missouri River Agricultural Levees.—Appropriation $8,000,000. Provides funds to start work on two agricultural levee units south of Council Bluffs totalling about 10 miles of earthen levees; a 6-mile levee between Brownsville, Neb., and Nemaha, Neb.; a start on the Big Nemaha levee unit of about 12 miles at the mouth of that stream; initiation of a 10-mile unit on the Kansas side of the river above St. Joseph, Mo.; a start on an 8-mile unit near Amazonia, Mo.; a start on a 10-mile unit on the Kansas side of the river above Atchison, Kansas; a 5-mile levee downstream from Nebraska City, and a short levee at Nebraska City. Also the funds will apply on continuance of existing levee contracts for units being built on the left bank of the Nishnabotna River near Hamburg, Iowa, and extension of the levee project up the east bank of the Missouri above the mouth of the Nishnabotna, for a unit under construction in the Peru, Neb., area two units above and below St. Joseph on the east bank.

Kensler's Bend Missouri River Bank Control Works.—Appropriation $700,000. Permits continuation of erosion prevention project on the river above Sioux City.

Chariton River Flood Control Levees in Missouri.—Appropriation $750,000. Work on this project was started in the spring of 1948. The new funds will permit additional channel improvement construction along the Chariton in the interests of flood control in the Chariton valley.

Little Sioux Flood Control Project on Little Sioux River in Iowa.—Appropriation $200,000 for advanced planning for levees and channel improvements in the interests of flood control on which it is hoped construction may start next year.

Denison, Iowa, Flood Control Project.—Appropriation $52,000. This will permit construction of local flood protection levees and channel improvement work on East Fork of Boyer River at Denison.

Forsyth, Mont., Flood Control Works.—Appropriation $74,200. Will permit completion of a contract for levees on the Yellowstone River to protect the city of Forsyth.

Bartley, Neb., Flood Control Works.—Appropriation $96,000. This fund will permit construction of local flood protection levees and channel improvements on Dry Creek for the city of Bartley.

Indianola, Neb., Flood Protection.—Appropriation $13,000, for completion of work now under contract to control floods on Coon Creek by levees and channel improvements.

Beulah, Mont., Flood Protection.—Appropriation $87,000. For initiation and completion this fiscal year of local levees and channel improvements on two coulees on the east and west sides of town which drain the upland area north of Beulah.

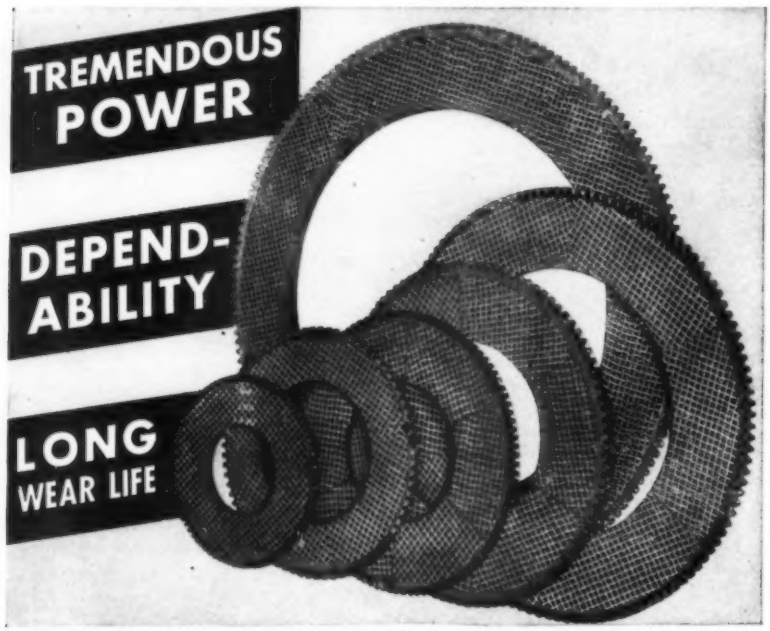
Hazen, Mont., Flood Protection.—Appropriation $35,500. Will permit contract award for levees and channel improvement to protect Hazen from overflow flood waters from Antelope Creek.

Mandan, N. D., Flood Protection.—Appropriation $334,000. To construct levees near the mouth of the Heart River for flood protection to the city of Mandan which this spring suffered substantial flood damage from the Heart River.

Hot Springs, S. D., Flood Protection.—Appropriation $175,000. For completion of work under contract to provide flood protection for Hot Springs along the Fall River. The work includes floodwalls, levees, and channel enlargement work.

Missouri River Navigation Channel Work.—Appropriations total $5,000,000 for work on the Missouri channel from Sioux City, Iowa to the mouth, under the 9-foot river navigation authorization by Congress.

Fort Peck Reservoir, Fort Peck, Mont.—Appropriation $3,700,000. For installation of a third power generating unit of 35,000 kilowatt capacity.



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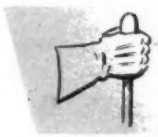

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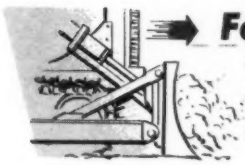
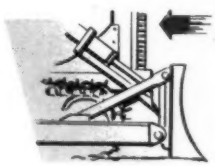


Faster Forward The load governs travel speed, not the operator s judgment. When bulldozer is in forward range, travel speed is as high as load and grade will permit. Results in faster dozing cycles, more yardage per shift and greater operator efficiency.



Faster Reverse High reverse is almost instantaneous, for under "no load", tractor zooms into high at 7 miles per hour to return for another pass. Two step shifting not required — merely shift unit into reverse and the torque converter does the rest.

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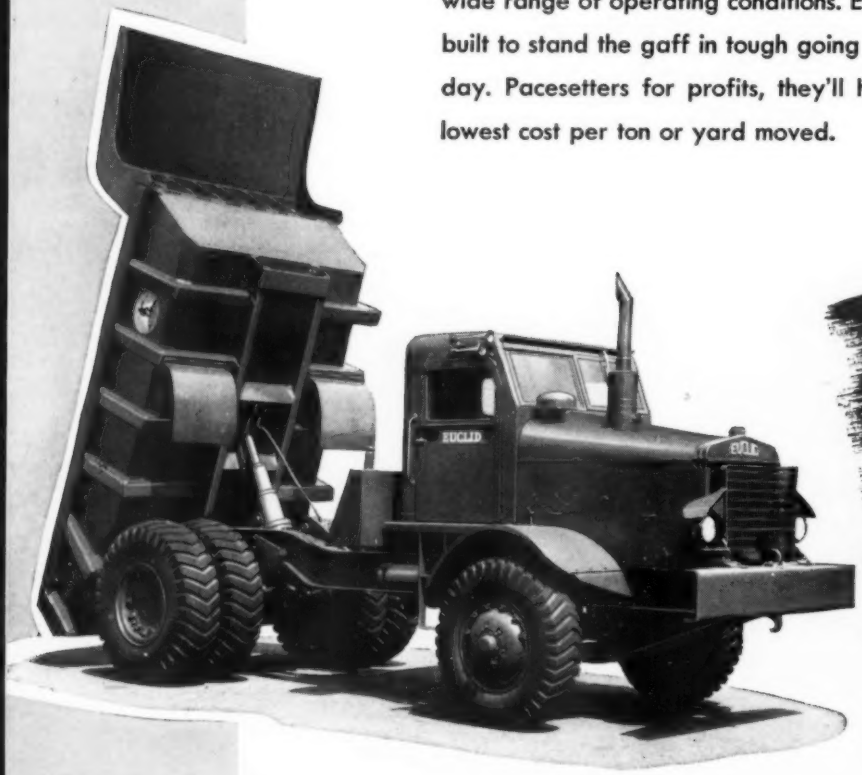
NEW REAR DUMP "EUCS"

for Your Tough Hauling Jobs

Here are new Rear-Dump Euclid models for off-the-highway hauling of earth, ore, rock and other heavy excavation on construction and industrial jobs. These "Eucs" have features designed to move materials faster and at lower cost . . . their simple but rugged construction assures long life under a wide range of operating conditions. Efficient on long or short hauls, they're built to stand the gaff in tough going . . . and to move more payloads per day. Pacesetters for profits, they'll help finish your jobs on schedule at lowest cost per ton or yard moved.



- Payload capacity, 30,000 lbs.
- Struck capacity, 9.7 or 11.1 cubic yards
- Diesel engine up to 200 h.p.
- Travel speeds loaded up to 35.4 m.p.h.
- Transmission, 10 speeds forward with 2 reverse speeds
- Air Booster Steering
- Drive axle—semi-rigid or spring mounted
- Tire sizes, front 13.00 x 24
- Rear duals, 16.00 x 24

EUCLIDS

Payload capacity, 44,000 lbs.
Struck capacity, 14.0 or 14.8 cubic yards.
Diesel engine up to 275 h.p.
Travel speeds loaded up to 32.3 m.p.h.
Transmission, 5 speeds forward, 1 reverse or 10 speeds forward with 2 reverse speeds
Hydraulic Booster Steering
Semi-rigid mounted drive axle
Tire sizes, front 14.00 x 24
Rear duals, 18.00 x 24

The new Euclids have these outstanding features... Air or hydraulic booster steering for ease in handling and positive steering control. Comfortable bucket type driver's seat with hydraulic shock absorber is adjustable for driver's weight and position. Ten speed transmission is available on several models for jobs requiring a wide range of gear selection and faster reverse speeds. Semi-rigid or spring mounting of drive axle... springs for good roads, long hauls and high speeds... semi-rigid mounting for tough hauls where fast travel speeds cannot be attained. Large tires on drive wheels — 16.00 x 24 to 18.00 x 32 duals — for good traction on off-the-road hauls.

The EUCLID ROAD MACHINERY Co. CLEVELAND 17, OHIO

Payload capacity, 60,000 lbs.
Struck capacity, 19.0 cu. yards
275 h.p. Diesel engine
Travel speeds loaded up to 20 m.p.h.
Hydraulic Booster Steering
Semi-rigid mounted drive axle
All tires are 18.00 x 32

Move the Earth

1500 yards an hour...

New Euclid VB loader pulled by Allis-Chalmers HD 19 tractor. Equipment owned by Terry & Steadman, Contractors, Bay City, Michigan.

General Motors Series 71 Diesel Engine as adapted by Allis-Chalmers for the HD 19 tractor.

24 hours a day

WHEN this Euclid VB loader and Allis-Chalmers HD 19 tractor went to work on the Louisville, Kentucky levee project, the dirt really began to fly—1500 cubic yards an hour, 24 hours a day.

"Almost double the amount other types of equipment move," the superintendent tells us. And no wonder! For the HD 19 boasts a wealth of smooth, dependable General Motors Diesel power.

Because the GM Diesel engine operates on the 2-cycle principle, it provides power at every downstroke. So the "six" performs like a "twelve"—turning out more work and sticking to it longer.

Whatever your need for power may be, it will pay you well to standardize on General Motors Series 71 Diesels. Not only are they frugal with fuel, but these engines are long-lived, durable workers that are easy to maintain. And you get an added bonus of parts interchangeability between engines of different sizes. See your local dealer, or write directly for further details.

DETROIT DIESEL ENGINE DIVISION

SINGLE ENGINES... Up to 200 H.P. **DETROIT 28, MICHIGAN** MULTIPLE UNITS... Up to 800 H.P.

GENERAL MOTORS

GM GENERAL MOTORS DIESEL POWER

DIESEL BRAWN WITHOUT THE BULK

NOT in the *Contract*

A minister was called in an emergency to preach a funeral sermon. The departed was a complete stranger, and after the service was well under way, the preacher realized to his horror that he had neglected to inquire as to the sex of the corpse. The name, unfortunately, was one of those trick cognomens that yielded no help, and the meager notes were not enlightening.

In a cold sweat, the minister proceeded as diplomatically as possible, trying to avoid an incriminating declaration. But finally he came to a point where he simply had to know. So while the choir sang, he beckoned to a nearby mourner, pointed to the casket, and whispered hoarsely, "Brother or sister?"

The mourner answered, "Cousin."

"What shall I say about the two peroxide blondes who made such a fuss at the game last night?"

Editor: "Why, just say that the bleachers went wild."

Handsome Assistant Project Manager: "Are you doing anything Sunday evening, Miss Jones?"

Miss Jones (all aflutter): "Not a thing, Mr. Smith!"

Handsome Assistant: "Then try to get in on time Monday morning, for a change."

An old Vermont contractor had never been to Washington, D. C. One day his small-town friends decided that since time was getting short, the old man should see the sights of the big city before he passed on. So they bought him a ticket and put him on the train and a few days later went down to meet the evening local which brought him back.

They crowded around him, "How did you like the Capital?"

Zeke wiped his mouth slowly with the back of his gnarled hand and looked passively at his friends:

"Wal, tell you the truth, there was so much goin' on down to the depot, I never did get up to the village."

An Englishman, visiting the United States for the first time, was driving along the highways and saw a large sign, "Drive slow. This means you!"

The Englishman stopped in surprise and exclaimed, "My word. How did they know I was here?"

An Irish contractor inviting a shovelrunner-employee to his wedding anniversary explained how to find his apartment. "Come to the seventh floor," he said, "and where you see the letter 'D' on the door, push the button with your elbow. And when the door opens, put your foot against it."

"Why do I have to use my elbow and my foot?" asked the shovelrunner. "Well, for heaven's sake!" exclaimed the Irishman, "you're not coming empty-handed are you?"

Little Girl—Daddy, why do editors refer to themselves as "we"?

Daddy—So that the fellow who doesn't like what's printed will think there are too many for him to lick.

The contractor, new to fishing, had hooked a very small trout from a little lake in the Canadian wilds. He wound it in excitedly until it was rammed against the end of his rod. Then he turned inquiringly to the guide and said, "What do I do now?"

The guide drawled, "Climb up the rod and stab it with your hunting knife."

Little Dot had just returned from a short visit to her uncle's in New York when the minister made his monthly visit upon the very religious mother. Of course the first thing the preacher did was to question the child about her trip to New York.

"Well, my dear did you have a nice time at your uncle's?"

"Oh, yes sir, I had a lovely time!"

"Well, what did you see and do?"

"Oh, I went to the loveliest Sunday school! The music played, the shade went up, and a lot of big girls danced in their bare tummies!"

See this GREAT

QUICK FACTS

- 13.3 cu. yd. capacity
- 16-ton load capacity
- 150 h.p. diesel engine
- 4 speeds forward to 17.3 m.p.h.
- Positive electric power steer
- Instantaneous speed selection
- 90° turn – minimum turn radius 14′ 6″
- Powerful air, disc-type brakes
- Big 21.00 x 25 tapered-bead tires
- Finger-tip electric control
- Power proportionating differential
- Shipping weight – 29,220 lbs.

Tournapull—Trademark Reg. U.S. Pat.

LE TOURNEAU LET EQUIPMENT

See your Le Tourneau Distributor NOW for complete information

T NEW "C" TOURNAPULL

17.3
miles per hour

150
horsepower

THIS NEW 16-ton capacity Tournapull has all the features you've been wanting — 17.3 m.p.h. hauling speed . . . 150 h.p. engine . . . total loaded weight of 61,220 lbs. which gives a weight to power ratio of 408 lbs. per horsepower. In addition, this modern high-speed dirtmover gives you instantaneous speed selection without loss of momentum . . . power proportionating differential for lugging through deep mud and sand . . . positive power steer . . . simplified electric control . . . plus many other exclusive LeTourneau features that mean increased production with a new and lower "lowest net cost per yard". See your LeTourneau Distributor today for complete facts on this great new C Tournapull. Get your order in early to insure prompt delivery.

r LETOURNEAU PEORIA, ILLINOIS HIGH-SPEED RUBBER-TIRED TOURNAPULLS

n MORE YARDS PER HOUR WITH RUBBER-TIRED POWER

Equipment you ought to KNOW ABOUT

Bottom-Dump Trailer

Manufacturer: Easton Car & Construction Company, Easton, Pennsylvania.

Claims: The Easton Model TB-4030 Bottom-Dump Trailer, designed to haul 32-ton loads of bituminous coal in strip mining

operations, is now in production.

The new model features a radial gate, air-powered, and operated either from the cab of the tractor or from the rear of the trailer. Axle and running gear design, and full-oscillating fifth wheel are based on engineering principles developed in Easton heavy-duty side-dump mine and quarry trailers.

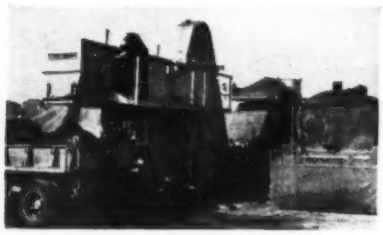
Tires are 16:00 x 24—24-ply lug type. Brakes are 20¼ x 7 air powered.

Bituminous Mixing Plant

Manufacturer: Iowa Manufacturing Company, Cedar Rapids, Iowa.

Claims: A new portable continuous volumetric-type bituminous mixing plant, called the Master Mixer, with a capacity of 100 to 150 tons per hour, has just been announced. Built in two units, on pneumatic tired steel trucks, the plant can be set up as a permanent unit in places where there is a regular demand for bituminous mixes.

Mixing unit consists of a large



single shaft pugmill with removable paddles adjustable to vary the mixing actions; a fully enclosed hot elevator collapsible for transporting; and a bitumen metering pump with adjustable volume control. All operating controls are easily accessible from the operator's platform. This unit can be set up quickly with front wheels removed to provide a truck driveway under the pugmill gate.

Gradation unit screens the aggregate into various sizes and assures a steady flow of accurately proportioned aggregates to the mixing unit. It consists of a fully enclosed Cedarapids-Symons double deck horizontal vibrating screen, a hot elevator, a three compartment bin with overflow chutes, an apron feeder with adjustable controls. The controls regulate the amounts of various size aggregates and assure their steady flow into the mixing unit.

Model "C" Tournapull

Manufacturer: R. G. LeTourneau, Incorporated, Peoria, Illinois.

Claims: The new Model "C" Tournapull has just been added to the LeTourneau line of earthmoving equipment. This rubber-tired unit is designed and built as an answer to the need for a medium sized, high-speed earthmoving tool in all construction fields.

The new Tournapull is used with the Model "E16" Carryall Scraper which has a capacity of 13.3 cubic yards. The unit, powered by a 150 H.P. 6-cylinder diesel engine, has four forward speeds ranging from 2.19 to 17.3 m.p.h.

One of the developments included on the new "C" Tournapull is electric control of Tournapull steering, scraper bowl, apron, and tailgate by individual electric motors.

The manufacturer states that another important feature of the new unit is a constant mesh transmission which gives instantaneous selection of gear ratios without shifting gears or loss of momentum. Conventional foot clutches and gear shifting are eliminated. Gear selection is controlled by a single selector lever. This lever controls flow of compressed air to clutches which, when actuated, give desired gear ratio.

A torque proportioning differential is another development included in the machine. If, when operating in mud, sand, or other soft materials, one wheel should start to slip, Tournamatic differential automatically delivers up to four times tractive effort of slipping wheel to the wheel on firmer footing.

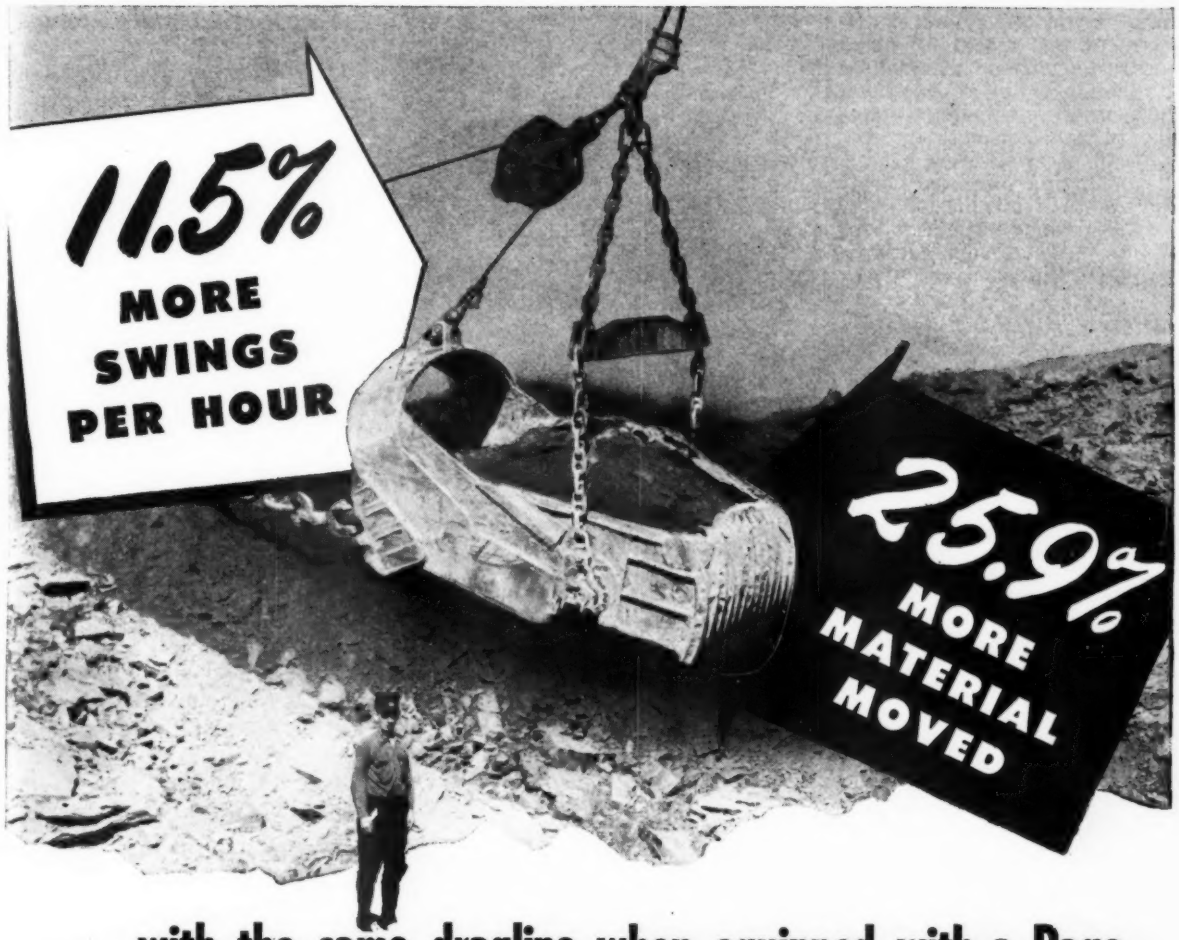
ATECO Bulldozer

Manufacturer: American Tractor Equipment Corporation, Oakland 3, California.

Claims: A new inside-mounted bulldozer for International TD-14W and 18W tractors is now being offered. It is designed especially for contractors, loggers, miners, and oil field operators handling excavating and clearing work.

Inside mount is said to remove bulldozer stresses from track and engine frames, and reduces wear on track rails, wheels, and idlers. Elimination of hydraulic track brackets and bell cranks improves vision and is said to eliminate loose-fitting working parts and brush catching elements.

The bulldozer is operated by a front-mounted HYDRECO hydraulic pump, leaving rear of tractor free for cable control



. . . with the same dragline when equipped with a Page AUTOMATIC

Rated capacity cu. yds.	No. of 24-hour days in use	No. of bucket loads in period worked	User's Engr's estimate of cu. yds. per bucket load	Total cu. yds. excavated in period worked	Cu. yds. excavated in 24-hour day	Average number of bucket loads per hour
25 Cu. Yd. Competing Bucket	15 consecutive days	19,685*	20.2	397,637	26,509	54.68
25 Cu. Yd. Page Automatic	16 consecutive days	23,424*	22.8	534,067	33,373	61.0

*Recorded by Esterline-Angus

On an actual 16 consecutive day run with all conditions alike — the same dragline, the same operators and the same material, a 25 cu. yd. Page AUTOMATIC Dragline Bucket outperformed a competitive bucket of the same rated size by a wide margin. The table gives all the facts found by a well-known coal company which made the test to determine the best bucket for their own stripping operations.

Assuming that both buckets carried equal loads, the Page AUTOMATIC made 11.5% more swings per hour. Considering both the increased number of swings and larger loads, the Page AUTOMATIC moved 25.9% more material than the competing bucket.

The extra bucket loads were obtained by the AUTOMATIC because of its quick loading features. Generally, little more than two lengths of the bucket are required to pick up a full load.

The increased yardage moved with the AUTOMATIC was due to its ability to obtain full loads on every trip while the competing bucket did not load the back end once out of ten times.

No effort was made during the test to determine the amount of dragline pull necessary to operate either bucket. However, other installations have proved that a Page AUTOMATIC requires up to 25% less dragline pull than the usual old style bucket.

Whether you need a small bucket or a big one, you can always move more yardage at less cost with a Page AUTOMATIC.

PAGE ENGINEERING COMPANY, Clearing Post Office, Chicago, Illinois

units. Hydraulic cylinders act directly on the machine's arms.

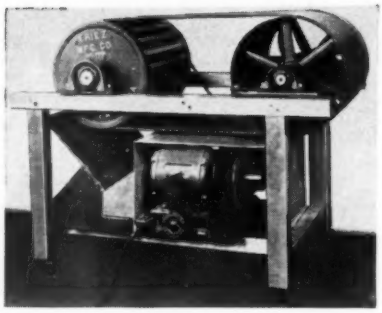
Direct push and thrust load of the bulldozer is taken through the trunnions, which are bolted to the transmission case by sixteen 7/8" cap screws, cross braced to the swinging drawbar casting, and also the transmission case tie-rods. The blade level is not effected by the free, independent track frame movement.

Magnetic Pulley

Manufacturer: Eriez Manufacturing Company, Erie, Pennsylvania.

Claims: Known as the "Puri-Pulley," this new non-electric magnetic pulley was developed solely to remove fine iron or less magnetic particles and afford automatic separation of ferrous from non-ferrous material ranging in size from ten to two hundred mesh.

While present magnetic pulleys are built to throw a magnetic field out several inches (for the removal of ordinary tramp iron), the "Puri-Pulley's" strength is concentrated in close to the face plate. At one inch from the pulley's surface, the magnetic field is approximately three times as strong as a standard pulley. Design characteristics, as well as new alnico material, are said to account for the additional strength.



The effective cleaning surface has been increased substantially by narrowing the air-gaps and increasing the number of pole plates. This provides more major areas of magnetic concentration, hence better magnetic separation.

Designed for use as a head pulley in belt conveying systems, the unit is available in 18" and 24" diameters and in belt widths ranging from 12" to 60".

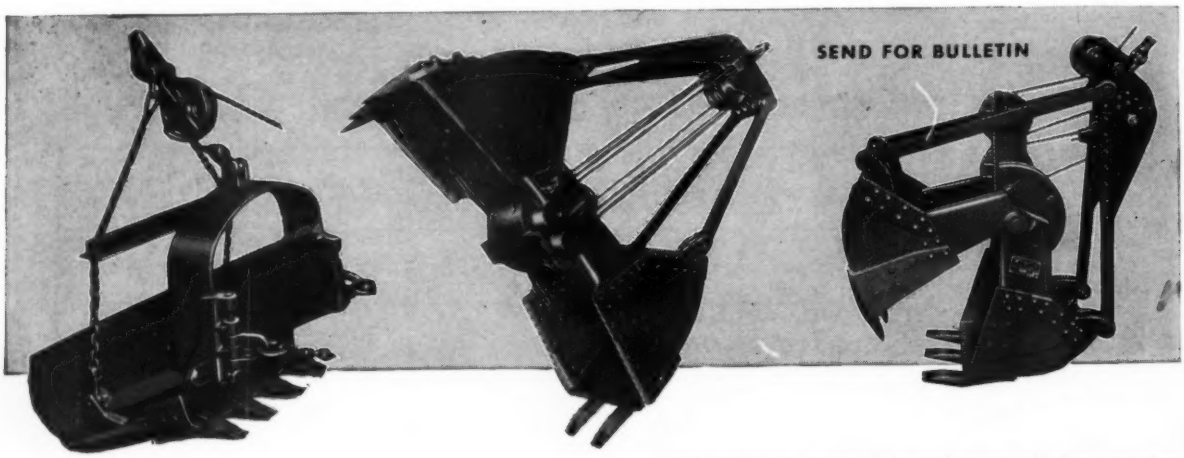
Top Suction Sump Pump

Manufacturer: Gardner-Denver Company, Quincy, Illinois.

Claims: Engineered to overcome one of the most common causes of pump failure—breaking of the pump shaft seal because of water pressure—a new sump pump, known as the "VP-4" is now available.

Design of the unit embodies a new principle—"top suction." Because of this feature, the oil seal of the pump is subjected only to static pressure from depth of immersion when the pump is not in operation. When the pump operates, water cannot reach the oil seal on the air motor.

Power for the "VP-4" is supplied by a vane-type air motor. The pump impeller of the closed type is made of hard, abrasion resistant alloy. A built-in oiler lubricates all moving parts of the pump with oil, the oil chamber having one-quart capacity for 24 hours' normal operation.



For Longer Life!

WELLMAN

Williams Type **BUCKETS**

● Count on longer life and more efficient service ... due to Wellman original **welded rolled steel construction.** You get the maximum digging power, and exceptional strength—without excessive weight! Specify Wellman, and you'll specify the best bucket for your purpose.

THE WELLMAN ENGINEERING COMPANY
7002 CENTRAL AVENUE CLEVELAND 4, OHIO

"Down Under"

(Continued from page 17)

by a ⅜-yd. Ruston-Bucyrus 10-RB diesel shovel owned by the Department of Public Works. This was the machine later used for loading in the gravel pits.

The granite encountered was very dense, occurring in large boulders in the top levels of the bywash excavation, and in fissured horizontal planes at 6 to 8-ft. intervals in lower levels. This latter formation increased drilling hazards and reduced the effectiveness of blasting.

Air for drilling was supplied from two sources. In the powerhouse on the north side of the dam were two steam-driven compressors, one a 300-cfm two-stage, double-acting Fowler, and the other a 150-cfm single-cylinder double-acting Rand, both very old. On the south side of the dam, nearer the bywash, were two portable compressors, a 190-cfm diesel-powered two-stage Consolidated Pneumatic, and a 150-cfm gasoline-powered Ingersoll-Rand.

Another Consolidated Pneumatic 190 was installed near the end of the job. Air was piped from the compressors to a receiver near the bywash excavation and from there to both ends of the cut.

Consolidated Pneumatic Model 8 and 10 hand-held hammers were used exclusively for drilling blast holes, and both 1 and ¾-in. steel was used—the latter for finishing. Average depth of hole was eight feet and spacing was 3-ft. 6-in. each way. Six drillers were employed on each shift when available and average footage drilled per shift varied from 18 to 26 feet, depending on operator skill and job congestion.

Drill steel was heated in an oil furnace and sharpened on an Ingersoll-Rand IR-33 sharpener. A limited number of Riley Rip-Bits and shanks were also used. These were found to give better performance than the ordinary drill steel. Approximately 30% better footage was obtained per bit, and, because the gauge of the bit was kept longer, deeper holes were possible.

The largest bits used were 2½-in., but since the supply of these was limited, hole size was dropped first to 2½-in. and later to 2-in. Ordinary steel had then to be used for first runs. The bits were sharpened on a Rip-Bit grinder and were found to take an average of 4½ resharpenings—a total of 5½ hours' duty—before discard.

Holes were bulled (sprung) and loaded with cartridges of A. N. 60 gelignite manufactured by Nobel and Company, Australia. An average 0.54 pounds of explosive was required to shatter a ton of rock —in both primary and secondary blasting. Secondary blasting was essential in the early stages of the work because shovels could not be spared from other work and blasted rock had to be loaded by hand.

Main blasting, employing No. 6 detonators with Blue Sump fuse, was done at noon, 5:00 P.M., 9:00 P.M., and 2:00 A.M. Secondary blasts were set off at 10:00 A.M., 3:00 P.M., 7:30 P.M., and 11:00 P.M. Such frequent firing was necessitated by congestion at the narrow faces and the high amount

4 Machines in 1

. . . HYSTAWAY makes possible not just a track-*type* tractor, but a bulldozer, dragline, clamshell and crane as well. Because the crane can easily be installed in 1 hour and removed in a half hour, the HYSTAWAY may be *a crane in the morning, a bulldozer in the afternoon.* It retains full unrestricted oscillation of the tractor crawlers over *any* ground surface, yet track rigidity may be accomplished by a crank control at the masthead. Operation is simple and conventional.

HYSTAWAY is available for the "Caterpillar" D6 and D7 tractors. Optional equipment includes manganese steel dragline buckets, tagline, jib boom and boom extension sections.

HYSTER is another of the famous tried and proven construction products we distribute and service in the major mountain and river areas of Eastern New York.

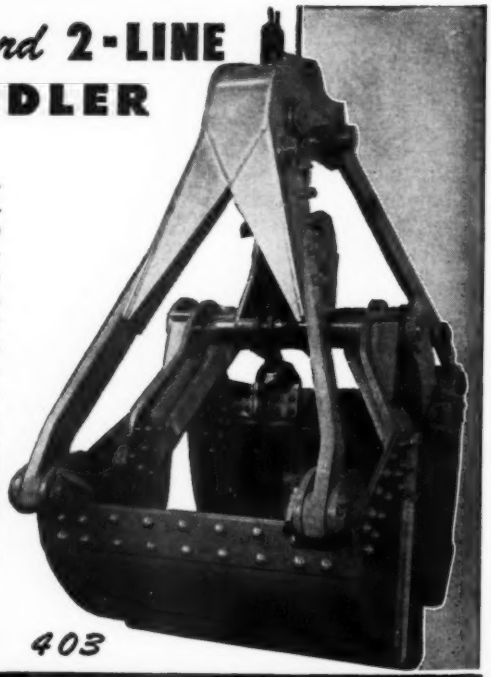
T. Southworth TRACTOR & MACHINERY CO. INC

Telephone: Albany 5-5255

Glenwood Road Menands, N. Y.

ERIE *Standard* 2-LINE REHANDLER

THIS compact Lever Arm Rehandler Bucket of normal proportions has ample closing power to fill to capacity in compact materials, and is so designed that the reeving can be adjusted to obtain maximum speed with capacity grabs in loose materials. We have reduced the "height open dimension" thus requiring minimum headroom, enabling you to pile higher and to discharge into higher hoppers. Lighter weight alloy construction provides more pay load (scoop contents) less bucket dead weight. To see this bucket in all detail write for bulletin 403.



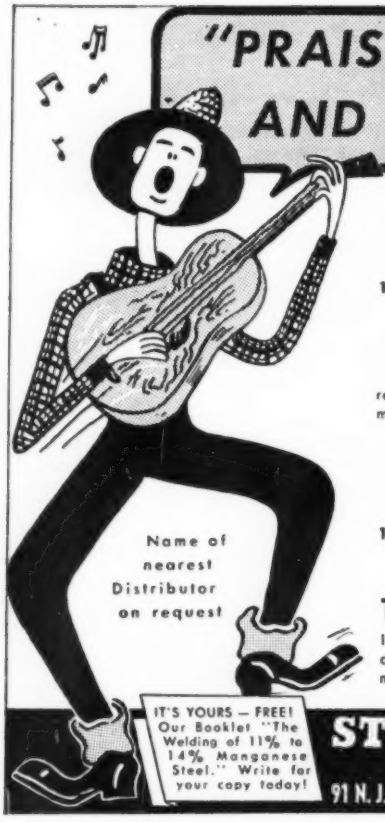
● *Write for Booklet 403*

ERIE BUCKETS • *A Complete Line*

Erie Steel Construction Co., 489 Geist Rd., Erie, Pa.

BUCKETS • AGGREMETERS • PORTABLE CONCRETE PLANTS

"PRAISE THE LAWD— AND PASS THE..."



MANGANAL

(Trade Mark Registered U.S. Patent Office)

11% to 13½% Manganese-Nickel Steel

BARE WELDING ELECTRODES for D.C.

require no cleaning and are especially recommended for high tensile build-up work.

MANGANAL

(Trade Mark Registered U.S. Patent Office)

11% to 13½% Manganese-Nickel Steel

SPECIAL TITE-KOTE for A.C. or D.C.

leaves no heavy slag deposits on weld, yet is dense enough to allow good penetration and manipulation of the arc.

Name of nearest Distributor on request

IT'S YOURS — FREE! Our Booklet "The Welding of 11% to 14% Manganese Steel." Write for your copy today!

STULZ-SICKLES CO.

Sole Producers

91 N. J. Railroad Avenue, NEWARK 5, N. J.

of secondary blasting required for hand loading.

Main shots were timed to take place during meal hours for men on the main embankment, and workmen in the bywash were instructed to take adequate cover. Warning whistles were started prior to blasting and blown continuously until shooting was completed.

When work on the embankment had progressed sufficiently so that excavation of earthfill could be reduced, the Ruston No. 6 and No. 10 steam shovels were transferred to the bywash for loading broken rock. The rate of drilling and blasting, however, was not sufficient to keep both units fully employed.

Nearly 12,000 Yds. Concrete

Sectional concrete liners were placed in the diversion tunnel (600 cu. yds.), the emergency control tower (350 cu. yds.), the cutoff trench below the bank, (9,500 cu. yds.), the spillway section of the bywash (650 cu. yds.), and the offtake works (600 cu. yds.), making a total of 11,700 cu. yds. of concrete poured on the project.

Aggregate was obtained on the job from the diversion tunnel and bywash excavations. Both granite and diorite were available, but the former was used almost exclusively because of its freer crushing qualities. The crusher used was a 16 x 12-in. Jaques Jar driven by a 24-hp 3-phase AC motor.

Crushed rock was screened to three standard sizes—¼-in., ½-in., and 1-in.—but for concrete in the cutoff wall, rock up to 3-in. was accepted in small quantities. Several 4-wheel-drive (necessary because of steep grades) 5-yd. dump trucks were used to haul aggregate from the crusher to the direct-feed batch plant bins.

Concrete was mixed in a ½-cu. yd. Tomlinson drum-type mixer powered by a 20-hp Southern Cross YEB diesel engine. As many as eight cu. yds. of concrete per hour were chuted direct to 5-yd. dump trucks which dumped to chutes above the sections to be poured. Portland Cement manufactured by Swan Portland Cement Co. of Western Australia was used.

The water-cement ratio main-

116,816,000
tons of limestone were used in construction work during 1947, plus 57,026,000 tons in industry and 23,128,000 tons in agriculture. Together with the limestone used in producing cement, it meant a busy year for Bucyrus-Erie quarry and mine shovels like the 54-B electric. Combining small shovel speed and ease of control with big shovel strength and capacity . . . with modern Ward-Leonard control for the smooth handling of shovel functions that steps up cycle speed . . . with 68 years of designing and manufacturing experience behind it — the 54-B is a "years ahead" machine that can deliver big output in tough digging hour after hour.
BUCYRUS-ERIE COMPANY
South Milwaukee, Wis.
BUCYRUS ERIE
49L47C
Greater Output...
Greater Economy
with Bucyrus-Eries!

The ¾ cu. yd. Sauerman Power Scraper pictured above keeps screening plant supplied with material that it scoops out of a wide bank of gravel.

Here is example of how Sauerman Slackline Cableway simplifies a difficult job. Reservoir is dug and spoil dumped in a high pile by a single machine.

Big Savings at your command

Savings in cost, time and labor are your direct gains on dig-and-haul jobs with a Sauerman Scraper or Cableway.

One-man control, fast and positive action. Reaches across a river, pond, pit, or to top of hill — moves material from any point within cable radius, and dumps automatically wherever desired. Power requirements moderate; maintenance simple.

Whether you handle small or large daily yardage, we can supply machine of capacity suited to your needs. Write for catalog and prices and describe your problem.

Sauerman Bros., Inc.

574 S. CLINTON ST., CHICAGO 7, ILL.

45 TONS

OF 15 FOOT PENSTOCK TUBE

is successfully transported on this

ROGERS HEAVY DUTY TRAILER

Extreme lengthwise and crosswise axle oscillation is attained in the rear end design of this type D Trailer. This load rides evenly and easily as the trailer wheels readily conform to roadbed irregularities.

EXPERIENCE builds 'em • PERFORMANCE sells 'em

ROGERS HEAVY DUTY

ROGERS BROTHERS CORPORATION

DESIGNERS and BUILDERS of HEAVY DUTY TRAILERS SINCE 1915

136 ORCHARD ST. **ALBION, PENNA.**

tained throughout the job was 0.58, and the gravel-sand ratio 1.98 by weight. Cement per cu. yd. ratio was 5.1 bags (94-lb. bags). All concrete was vibrated in place by Ingersoll-Rand 1V's and 2V's.

Most of the 40-in. annual rainfall in this area falls during winter months (May to August). Stream flows are, therefore, high in July and August and diminish very considerably in February and March at the end of the summer. The maximum recorded flow is 2200 cfs and the minimum drops to less than 15 cfs at the damsite.

For this reason stream control throughout the job presented no great difficulties since difficult sections of the project were undertaken only during the light flow periods. Water was carried over the cutoff trench in the early stages by means of flumes of corrugated iron until completion of the diversion tunnel. Two 2½ by 2½-in. Duplex air pumps and one 3-in. barrel pump with 3-hp Petters gasoline engines were able to cope with what little water seeped into the trench for the concrete core of the dam.

Other pumps used on the project included two HSRB 2-in. Pulsometer 10,000-gph centrifugals, a 2-in. two-stage 3,000-gph Pulsometer, a 1½-in. Kelly and Lewis 3,000-gph four-stage centrifugal, a 1½-in. Stalker 2,500-gph centrifugal, and several small dewatering pumps.

Drove 1100-ft. Diversion Tunnel

The diversion tunnel driven through the south abutment of the dam was 14 feet in diameter where unlined and 12 feet where faulty rock zones necessitated lining with concrete. The 1108-ft. tunnel was commenced in December, 1939, and water was flowing through by October, 1940.

A low diversion dam of clay was built after the winter flows had subsided. During the first summer, the main bank was brought above R.L. 420 feet, which provided sufficient head over the diversion tunnel to ensure that all flood waters would be carried by the tunnel.

No relocation of roads, railroads, or public utilities was required, the basin being entirely virgin forest country. Although

removal of a lumbering railway was contemplated early in the job, this was moved by the owner to a new area before the dam was completed.

Operations throughout the final season were on a 3-shift-per-day basis five days a week. When necessary to catch up any part of the project which was lagging behind, some work was done on weekends. Each shift of 8-4/5 hours included 30 minutes for meals and two 10-minute tea breaks.

Earth was moved only during day and afternoon shifts. The night shift, for maintenance and repair work only, overlapped both the afternoon and following day shifts.

Provision of adequate excavating equipment was extremely difficult due to the widespread postwar shortages. As a result, available equipment had to be shifted from one section of the project to another to attain the best possible balance. No spare pieces of equipment were available for emergencies and necessary repairs were delayed for long periods of time because of unavailability of replacement parts.

Large Labor Turnover

Manpower was recruited locally and from the Labor Bureau of Perth and Bunbury. But unsettled conditions in the transition period from war to peace made it most difficult to maintain even a semblance of stability in the labor force.

During the 12 months of maximum activity with an average number of men employed ranging between 450 and 500, a total of more than 1800 men passed into and out of the job. This increased administrative work considerably and exerted an unfavorable influence on job efficiency, particularly as regards operation of machinery.

The engineering force was made up entirely of members of the Department of Public works of Western Australia. Two senior and four junior engineers were employed during the final season. The six were assigned the following jobs: supervision of main embankment work on each of the day and afternoon shifts, plant operation and maintenance, concrete and clearing work, outlet control works, and engineer in charge.

Timber houses were provided for three of the engineering staff, and timber framed and lined tents for the married members of the staff. Single staff men were quartered in timber-framed tents and ate in a staff mess. All staff tents were 10 x 12-ft. with wooden floors.

Labor personnel was housed in 8 x 10 ft. timber-framed tents, also with wooden floors. Married quarters were made by assembling two or more tents around a framed kitchen. Men who cooked for themselves had iron fireplaces built into their tents.

A large boarding house operated on contract catered for more than 300 men. In addition, there was a light refreshment shop. Other facilities included a complete post office, general store, school, first aid center, baby health clinic, Salvation Army hut, drying shed, and laundry.

YOU'LL FIND IT ON PAGE 20

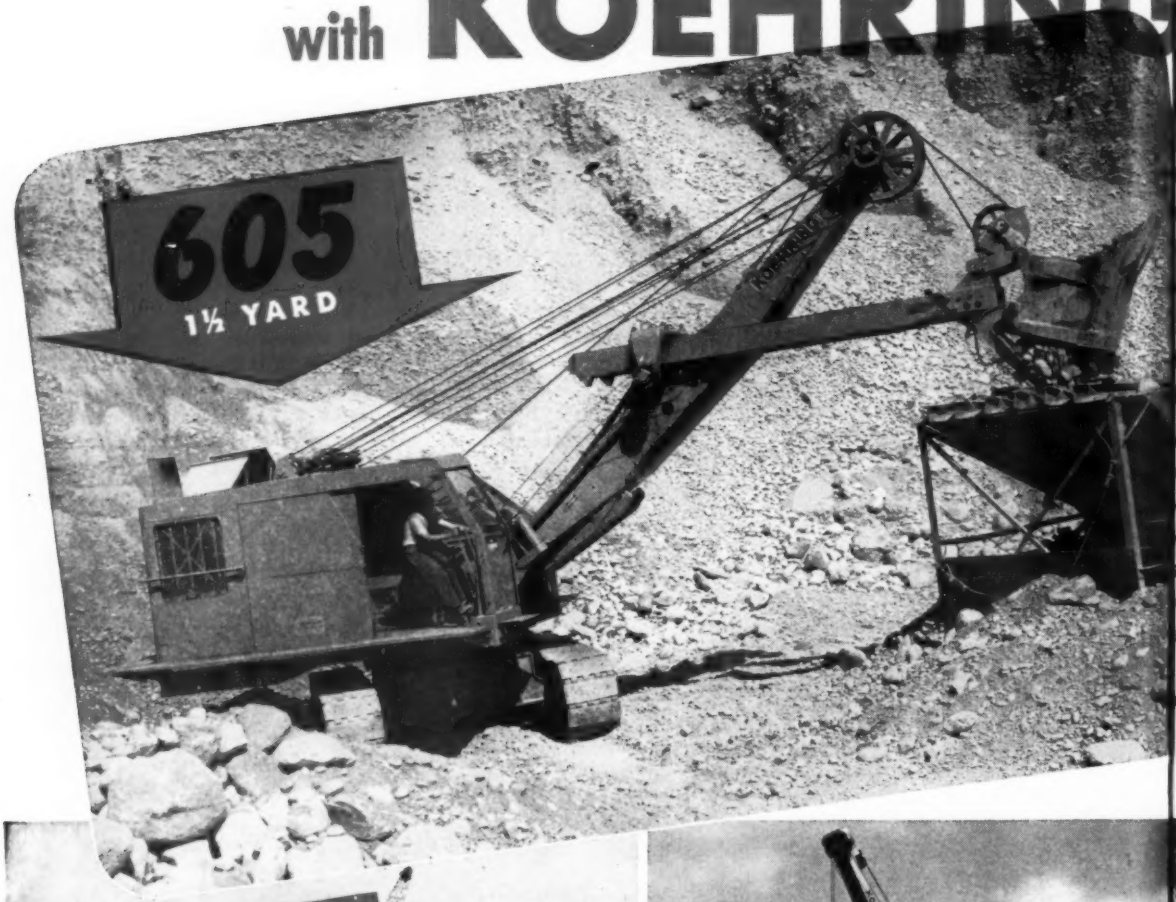
Among general contractors, one of the most popular Blaw-Knox Buckets is No. 672, rated ¾ Cu. Yd. It's a general purpose two-line, lever arm type that digs like a mole. On page 20 of Catalog 2076, there's a photo of it at work, and on page 34 you will find a complete table of weight, measurements and other data you need. Of the more than 100 types and sizes of Blaw-Knox Buckets, this may be the one to speed your work. Write us for *Catalog No. 2076.*

BLAW-KNOX DIVISION
OF BLAW-KNOX COMPANY
2074 Farmers Bank Building
Pittsburgh 22, Pa.

Bucket Selection Made EASY
Catalog 2076

BLAW-KNOX CLAMSHELL BUCKETS

MORE HOURS per shift with KOEHRING



MORE PROFITS per year

HEAVY-DUTY excavators

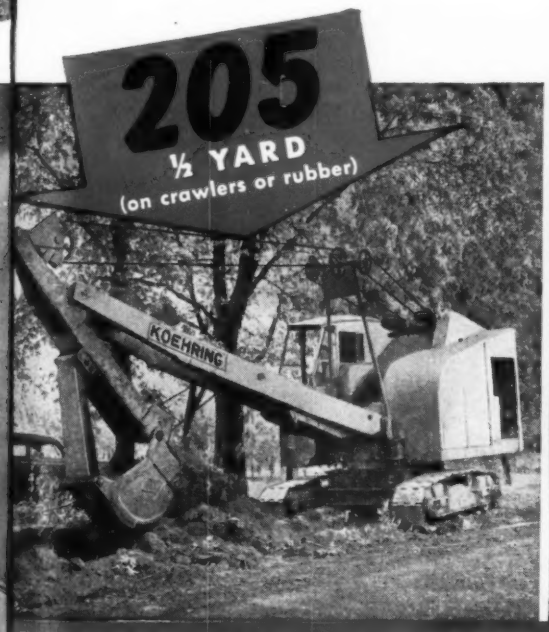
OU get steady performance, cut maintence delays and expense, save plant schedule adjustments, insure customer satisfaction, by ing Koehring HEAVY-DUTY excavators. They e tough, long lived, built simple and handy encourage good operator care and preventive maintenance. See your Koehring Distributor before you buy.

e Koehring 605, 1½ yard as shovel, is big d strong, ideal for rock excavation, with its avy-duty shock absorber mounted shovelom. Mounted on Koehring self-cleaning crawl-, available in various sizes. Koehring 605 anes are equipped with a high A-frame which n be lowered or raised by power. The 605 easily converted from shovel to crane, or agline.

The Koehring 304, ¾ yard as shovel, with high operating speed and Koehring construction, gives you durability and increased production. You can get the Koehring 304 either crawler-mounted, or rubber-mounted as Cruiser Crane or truck crane for greater mobility. Front ends on crawler and truck models can be quickly and easily changed for shovel, pull shovel, dragline, or crane operations.

The Koehring 205, ½ yard as a shovel, features independent traction for greater speed and mobility and a 2 in 1 shovel boom for both shovel and pull shovel work. Heavy-duty construction, ease of operation, speed and maneuverability of the 205 gives you a money-making excavator. The 205 is available mounted on rubber or crawlers and is easily converted to shovel, pull-shovel, crane or dragline.

Write for FREE catalog



KOEHRING COMPANY Milwaukee 10, Wisconsin

Subsidiaries JOHNSON • KWIK-MIX • PARSONS

New trade literature

Title: **"Handbook of Fire Protection"**
Subject: The tenth edition of the National Fire Protection Association's Handbook of Fire Protection presents in compact form, for ready reference, the essential information on fire prevention and protection that time has crystallized into good practice. It covers both life safety from fire and the protection of property.

Among the many completely new subjects treated in the tenth edition of the Handbook are a new chapter on the chemistry and physics of fire, a new chapter on water spray (fog) protection, a complete new treatment of the general field of building construction, with several chapters concentrated on interior finish and insulation, flameproofing treatments, tables of fire resistance ratings of walls, partitions, floors, etc.

Information is given as to the properties, hazards, proper storage practices and best extinguishing methods for hundreds of different solvents and chemicals.

Where to Get: National Fire Protection Association, 60 Batterymarch Street, Boston 10, Massachusetts (Price $9.50).

Title: **Pile Hammer Folder**
Subject: This recently published four-page folder lists in concise form the specifications of the entire line of McKiernan-Terry Pile Hammers and Extractors.

In addition to specifications, the folder also includes a number of photographs of McKiernan-Terry hammers at work on projects in widely separated locations.

Where to Get: McKiernan-Terry Corporation, Department "J," 15 Park Row, New York 7, New York. Ask for Circular No. 2 (Free).

Title: **Bucket Loader Bulletin**
Subject: Two Nelson heavy-duty bucket loaders, featuring three-yard elevator, hydraulic boom hoist, and a 16-to-1 ratio between high and low working speeds, are described and illustrated in this new bulletin.

Where to Get: N. P. Nelson Iron Works, Incorporated, Department 2C, Clifton, New Jersey (Free).

Title: **Power Grader Bulletin**
Subject: A two-page bulletin has just been published by the Meili-Blumberg Corporation on its new power grader for heavy-duty grading, ditching, filling, and road building jobs. The bulletin illustrates the unit operating with such attachments as a power sweeper, scarifier, snow plow, and equipped with leaning wheels and extra large rear tires. Complete specifications for both the 40 h.p. gasoline or diesel powered models are provided.

Where to Get: Meili-Blumberg Corporation, New Holstein, Wisconsin. Ask for Bulletin No. 141 (Free).

Title: **Portable Electric Plant Folder**
Subject: Onan portable electric generating plants are described in this new two-color folder.

Onan electric plants, made portable by means of carrying handles and frames and rubber-tired, two-wheel dollies, are pictured in models ranging from 350 Watts to 3,000 Watts in 115-volt, 60-cycle, Alternating Current. 115-volt, Direct Current models are also described in 600 to 5,000 Watt range.

Where to Get: D. W. Onan & Sons, Incorporated, 43 Royalston Avenue North, Minneapolis 5, Minnesota. Ask for Form A-200 (Free).

Title: **Guide for Welders**
Subject: This new vest pocket guide for welders is filled with useful information. It presents the characteristics of various welding arcs, four essentials of proper welding procedures, type of joints, typical positions, chart of standard steel shapes, photographs of good and bad welds, etc.

Where to Get: Hobart Brothers Company, Troy, Ohio (Free).

Title: **Weigh Batcher Folder**
Subject: A new six-page folder on Noble weigh batchers has just been released. It describes and illustrates Noble's three types of batching control: manual, semi-automatic, and full-automatic. Dial scales, recently made optional equipment on the manual and semi-automatic units, are included in the folder.

Where to Get: Noble Company, 1860 7th Street, Oakland 7, California (Free).

Title: **Load-Grab Catalog**
Subject: A catalog, detailing the applications and optional equipment of the Load-Grab, an attachment for the Hyster Models "20" and "40" lift trucks, has just been published.

The Load-Grab a hydraulic attachment with steel arms designed for the squeeze carrying of loads, is fully described and colorfully illustrated in the catalog.

Where to Get: Hyster Company, Portland 8, Oregon. Ask for catalog No. 1099 (Free).

MOON Generators
TURBO and BELT DRIVEN
for LIGHT and POWER
The Ideal Small Power Plant
IMPORTANT MOON FEATURES
• GOVERNOR AND COMPOUND WINDING on steam-driven models prevent excess voltage output which might injure electrical equipment.
• ONLY 2 EASY-TO-REACH OILING POINTS.
• AUTOMATIC CUT-OFF on larger capacity steam-driven models prevents overload damage to generator.
MODEL 8 (STEAM)
For Lights . . . Ventilating Fans . . Other Electrical Equipment . .
SEND TODAY FOR ILLUSTRATED CIRCULARS.
MODELS FROM 1 TO 7½ KW CAPACITY.
Moon MANUFACTURING CO.
ESTABLISHED 1893
122 N. JEFFERSON ST. . . . CHICAGO 6 . . . ILLINOIS

Notes from the manufacturers

General Motors Corporation, Detroit Diesel Engine Division, Detroit 28, Michigan, announces the appointment of the Earle Equipment company, Detroit, as distributor for the Series 71 diesel engines.

Bucyrus-Erie Company, South Milwaukee, Wisconsin, has appointed Nevada Equipment Service, Incorporated, 1525 E. Fourth Street, Reno, as distributor for the company's line of ⅜- to 2½-yard excavators. The firm's territory will include all of Nevada —with the exception of Clark, Elko, Whitepine, and Eureka Counties— and the following parts of California: Plumas and Alpine Counties; Lassen County, except for the northwest corner bounded by a line ten miles south and parallel to U. S. Highway 299; the eastern portions of Sierra, Nevada, Placer, and Eldorado Counties, bounded on the west by a line running ten miles west and parallel to U. S. Highway 89.

In addition to excavators, Nevada Equipment Service handles the complete line of Bucyrus-Erie tractor equipment for International Industrial tractors.

Air Reduction Sales Company, New York 17, New York, announces that the former Apparatus Sales Department and the former Arc Welding Sales Department have been merged into one unit to be known as the Equipment Sales Department.

Dale D. Spoor has been named manager of the entire Equipment Sales Department, while Ira B. Yates becomes manager of Arc Welding and Supplies Sales, and J. F. Carroll becomes manager of Apparatus Sales.

Davey Compressor Company, Kent, Ohio, has appointed the G. W. Clements Equipment Company, Columbus, to a Davey dealership. The new dealer will distribute all equipment of Davey manufacture including Air Chief portable compressors; Auto Air (truck-mounted) units; Track-Air (tractor-mounted) machines; Departmental (industrial) stationary compressors; mine and railcar compressors; Da-V-Lite portable lighting equipment; and the Davey Heavy Duty Power Take-off for trucks.

Clements territory includes that portion of Ohio bounded by Wyandotte, Crawford, and Richland counties on the north; Knox, Licking, and Perry on the east; Hocking, Ross, and Fayette on the south; and Madison, Union and Hardin on the west.

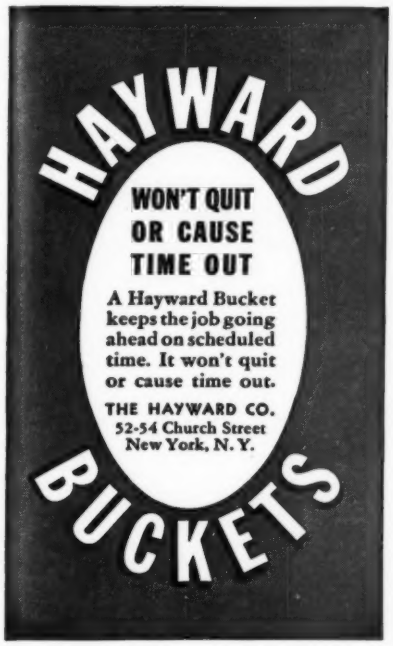
Company headquarters are at 476 Avondale Avenue, Columbus.

New Holland Manufacturing Company, Mountville, Pennsylvania, has announced the appointment of two new district managers. Keith B. Hubbard has been assigned to the New York State and New England Territory, while A. E. Ainlay is in charge of the Western District, including California, Oregon, Washington, Montana, Wyoming, Utah, and Colorado.

SKF Industries, Incorporated, Philadelphia, Pennsylvania, manufacturer of ball and roller bearings, announces the appointment of M. H. Courtenay as Atlanta District Manager. Mr. Courtenay is succeeding Nils Miller who has retired after completing 30 years of service with the firm.

As Atlanta district manager, Mr. Courtenay will supervise a territory that includes all of Florida, Alabama, and Georgia (except Richmond and Chatham counties), 46 counties in

(Continued on page 56)


HAYWARD
WON'T QUIT OR CAUSE TIME OUT
A Hayward Bucket keeps the job going ahead on scheduled time. It won't quit or cause time out.
THE HAYWARD CO.
52-54 Church Street
New York, N. Y.
BUCKETS

Front - End
LOADERS
For Industrial Tractors
Extensible Booms,
⅝-cu. yd., Bucket 8-foot lift,
Backfiller Blades
White Mfg. Co.
ELKHART INDIANA

save time between jobs with JAHN TILT TRAILERS

Tilt—load—and you're off in a matter of minutes with a Jahn Tilt Trailer. No jacks or loading ramps required. One-man operation. Positive, automatic safety lock holds platform in position when loaded or empty. Rubber mounted drawbar absorbs road shocks and protects both truck and trailer. Ideal for transporting tractors—rollers—compressors —shovel-loaders—mixers, etc. Jahn Tilt Trailers are available in 8 ton capacity tandem axle and 5 ton capacity single axle models. Write for specifications and illustrated bulletin or see your nearest Jahn distributor.

C. R. JAHN COMPANY
Dept. 49—1106 W. 35th Street, Chicago 9, Illinois
Heavy duty Trailers from 5 to 100 tons

TO ADVERTISE: All advertising in this section is payable in advance. Rate: 60c per line, or $7.20 per inch of 12 lines. Minimum charge $2.40. No discounts; no commissions. Please count your copy carefully to avoid delay. Each line contains 41 characters (34 characters if all capital letters are used). Count spaces and punctuation as one character each. Allow 10 characters for box number, if blind advertisement is desired. Be sure to enclose the correct amount of money with your order. Closing date — 15 of preceding month. Example: January closes December 15th.

TO INQUIRE: Be sure to address your inquiry to the advertiser by using the correct box number. Mail your letter in care of Excavating Engineer, South Milwaukee, Wisconsin. Write each advertiser a separate letter. Do not write us for name and address of advertiser. This information will not be given out. We have no information about the equipment advertised other than that shown in the advertisements themselves.

Northwest 95 3-yd. dragline. Shovels 1; 1¼; 1½ yd.
A. W. Nevers **Mt. Pleasant, Iowa**

FOR SALE
2½-yd. P & H Electric Shovel, Model 1225

This shovel has a 3-yard bucket and is in very good mechanical and electrical condition.

Shovel can be demonstrated under power.

Electrical equipment: 3 phase, 60 cycle, 2300 volts.

Good selection of new parts to be sold with shovel.

JOHNS MANVILLE PROD. CORP.
Lompoc, California

Brand new 1½ yd. backhoe will sell for cash or rent with or without operator or will contract job. Box 3285

Bucyrus-Erie 50-B diesel combination shovel and dragline. Serial Number 4710. Price $10,000 f.o.b. Watsonville, California. Box 3281

6 yd. diesel walker dragline
2 yd. diesel walker dragline
Diesel cat. dragline, 3 to 4 yd.
Steam drags. on trucks, to 7 yd.
Shovels — 1½, 1¾ yd., diesel & elec.
1½, 1¼, 1 yd., diesel & gas cranes
3 ft. cone crusher. Misc. others.
James Wood, 53 W. Jackson, Chicago 4, Ill.

USED 18" OR 20" ELECTRIC HYDRAULIC DREDGE. MID-WESTERN LOCATION. BOX 3251

4 — slightly used, but like new, "Firestone" rubber tires 21.00"/28", 20 ply, "GG Earthmover" with tubes and flaps. At bargain price. Box 3288

Int'l. TD-18 with B-E hydraulic dozer. A. C. HD-7 with Baker hydraulic dozer. Osgood heavy duty ½ yd. backhoe with shovel attachment. Studebaker 6 x 6 dump truck. Box 3290

Complete shovel front for Bucyrus-Erie 10-B twin rope crowd machine. Also 28 ft. clamshell boom with drum lagging for same machine. Box 3287

Pull shovel attachment for Manitowoc Model 2000. New, never used. Located Chicago, immediate delivery. Box 3289

ALL-STEEL DERRICKS

10—30 ton capacity BRAND NEW Wiley all steel stiffleg derricks, 32' masts, 60' booms, complete; can furnish with gasoline, electric or steam hoists.

ALSO

Air compressors, bins, boilers, cable, conveyors, cranes, crushers, engines, hammers, conc. mixers, light plants, pneumatic tools, pavers, pumps, saw rigs, welders.

EQUIPMENT CORPORATION of AMERICA

CHICAGO 12	PHILADELPHIA 2
1170 S. Washtenaw Av.	1505A Race St. Schaff Bldg.
PITTSBURGH 30	NEW YORK 7
P.O. Box 9330	30D Church Street

Shovels-cranes, 1¼, 1½, 2, 2½, 4, 5-yd.
Draglines, 3, 3½, and 5 yd., diesel & elec.
Loco. cranes, 40-ton diesel; 25-ton steam.
Guiberson diesel engines, 150 HP, unused.
Trench excavators, Buckeye & P&H (4).
A-C gyratory rock crushers, 27" and 16".
Jaw crushers: 60"x42", 24"x36", 28"x36".
Plymouth 10-ton gas locomotive, 36" gauge.
Steam locos., 17 to 52 tons, various gauges.
Gas & diesel locomotives, 5 to 45 tons.
Traylor rotary coolers (6), 8'3"x45'.
Gold placer dredge, 4½ ft., diesel, pontoon.
B-Erie shovel front att., 2½ yd., 52B-55B.
Crane boom, 40', 1 or 1¼-yd., 46" base.
H. Y. Smith Co., 828 N. B'way, Milw. 2, Wis.

Surplus Swivel Hook Double Sheave Block
1 40 ton "American" 24" swivel hook double sheave block, diamond pattern with cast steel sheaves grooved for ⅞" rope. Sheaves to be bushed with plain bronze bushings, with center bored sheave pin and ¼" Alemite hydro grease fitting No. 1980 equipped with 300 lb. cheek weights and 5½" swivel hook. Total weight of block 1190 lbs. Dwg. BEFP 1-M-6560.

BUCYRUS-ERIE COMPANY
South Milwaukee, Wisconsin

SURPLUS STOCK SALE
Dippers for Bucyrus-Erie Shovels
1—½ cu. yd. drag shovel dipper—17-B.
1—2 cu. yd. rock dipper 75-B.
New Dragline Buckets
2¼ yard Red Arch Type AX medium duty bucket.
5 yard Red Arch Type AY heavy duty bucket.
6 yard Red Arch Type AY heavy duty bucket.
F.O.B. Works
Write for any further information desired
BUCYRUS-ERIE COMPANY
Parts Department
South Milwaukee **Wisconsin**

Bucyrus-Erie No. 8 bit dresser. Complete and in perfect operating condition. Located in Washington State. Box 3271

MECHANICS • HOME STUDY

Step up your own skill with facts & figures of your trade. Audels Mechanics Guides contain Practical Inside Trade Information in handy form. Fully illustrated. Easy to Understand. Highly Endorsed. Check book you want for 7 days' Free Examination. Send no Money. Nothing to pay postman. ☐Carpentry $6 • ☐Auto $4 • ☐Oil Burners $1 ☐Sheet Metal $1 • ☐Welding $1 • ☐Refrigeration $4 ☐Plumbing $6 • ☐Masonry $6 • ☐Painting $2 • ☐Radio $4 ☐Electricity $4 • ☐Mathematics $2 • ☐Steam Engineers $4 ☐Machinist $4 • ☐Blueprint $2 • ☐Diesel $2 • ☐Drawing $2. If satisfied you pay only $1 a month until price is paid. **AUDEL, Publishers, 49 W. 23 St., New York 10, N. Y.**

New independent diesel driven electric generating plant, 650 H.P. diesel engine, 420 K.W., 2300 volts, 3 phase, 60 cycle generator, mounted on rubber-tired special trailer. Located in Central Nebraska. Box 3277

WANTED: High Lift shovels for coal stripping. Box 3284

HELP WANTED

Permanent position for competent mechanic familiar with the overhaul and maintenance of all standard makes of shovels from ½ yd. to 2 yds. Must be sober and reliable, capable of handling men. State qualifications, and salary expected. Location Maritime Provinces. Box 3279

POSITION WANTED

CAN THIS MAN HELP YOU?

College graduate with 13 years quarrying, crushed stone and building block manufacturing experience and some sales experience, who lives in Central Eastern Pennsylvania, desires a permanent sales representative connection with a manufacturer or distributor of power shovels or crushing, screening, conveying, block manufacturing or allied lines of equipment, or mill supplies. Territory — Eastern Pennsylvania and adjacent areas. For further information write: Box 3286

If you are Buying or Selling Used Equipment this is the place to let Excavating Industry know about it.

The *Control* You Need to Keep Dirt on the Move!

SCRAPERS

BLADE EQUIPMENT

RIPPERS

SMOOTH, accurate, positive in action, and dependable day after day . . . that's control with Bucyrus-Erie Power Control Winches. Operators say they're the easiest handling winches on the market . . . that adjustments are simple and lasting . . . that maintenance is easy. Owners report that the cost of maintaining Bucyrus-Erie Power Control Winches is low . . . that they keep equipment operating at its best . . . and that — most important of all — they're BIG factors in keeping dirt on the move!

Investigate the single and double drum, front and rear-mounted models offered for use with International crawlers. See your International Industrial Tractor Distributor.

BUCYRUS-ERIE COMPANY, SO. MILWAUKEE, WIS.

For BUCYRUS ERIE TRACTOR EQUIPMENT See Your INTERNATIONAL Industrial Tractor Distributor

Power Control Winches

- **DOUBLE-DRUM** rear mounted for all sizes of International Crawler Tractors; **SINGLE DRUM** front mounted for TD-24
- **SIMPLE PLANETARY DRIVE**
- **ADJUSTABLE LEVERS**
- **EXTERNAL BRAKE SURFACES**
- **INTERCHANGEABLE REVERSIBLE BANDS**
- **MOULDED BRAKE LININGS**
- **ANTI-FRICTION BEARINGS**
- **SINGLE BEARING ADJUSTMENT**
- **SINGLE BAND ADJUSTMENT**
- **SINGLE OIL BATH LUBRICATION**
- **TRANSPARENT OIL LEVEL SIGHT**

10ST48C

DREDGES

HYDRAULIC DIPPER CLAMSHELL

Bolted sectional steel hulls for landlocked, inland waters

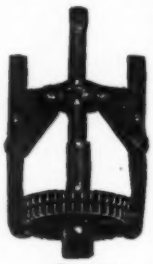
If you need a dredge, write us!

AMERICAN STEEL DREDGE CO. INC.
FORT WAYNE 1 · INDIANA · U.S.A.

DESIGNERS AND BUILDERS OF DREDGING EQUIPMENT SINCE 1905

SURPLUS STOCK SALE!

33 Brand New Gear and Wheel Pullers



Popular Size Model No. 1004

The harder the pull, the tighter the arms hug the work. Made of heavy one-piece forged steel yoke. Heat treated forged steel arms and straps.

Will take gears, wheels, etc., up to 18" in diameter.

Diameter	18"
Reach	15½"
Diameter, Screw	1¼"
Length, Screw	16"
Hole adjustment	3 hole
Weight	40 lbs.

Bargain Price $22 ea. F.O.B South Milwaukee

Bucyrus-Erie Co.
South Milwaukee, Wis.

Manufacturers' Notes

(Continued from page 53)

central and western Tennessee, 56 counties in Mississippi, and 25 parishes in southeastern Louisiana.

Hose Accessories Company, Philadelphia, Pennsylvania, has opened a direct factory branch for the Midwest Area at 1500 South Western Avenue, Chicago 8. Both office and warehouse are under the personal supervision of Wallace W. Neeb, the company's factory representative. A large stock of the complete line of "LE-HI" products will be kept on hand to provide fast, comprehensive service to the company's distributors supplying construction, mining, industrial, and other users of hose couplings throughout the Middle West.

All-State Welding Alloys Company, Incorporated, White Plains, New York, has named Doswell Orin Winton to the position of Regional Sales Manager for the company's line of low-temperature welding and brazing alloys and fluxes in the states of Michigan and Ohio.

Goodyear Tire & Rubber Company, Akron, Ohio, has appointed Charles B. Miller District Sales Manager of the firm's Mechanical Goods Division at Chicago. The district embraces Illinois, Wisconsin, and southern Indiana.

Mr. Miller succeeds Guy E. McMahon, who will remain in Chicago as special representative for Goodyear industrial rubber products.

American Steel Dredge Company, Incorporated, Wayne Crane Division, Fort Wayne 2, Indiana, has appointed Samuel H. Gifford as Sales Representative in the firm's western territories.

Euclid Road Machinery Company, Cleveland, Ohio, has appointed D. R. Anderson Manager of the firm's branch office in Hibbing, Minnesota.

Turner Construction Company, New York 17, New York, has opened a Chicago office in the Bankers' Building, 105 West Adams Street. Clarke I. Knudson, contractor-engineer, will be in charge.

Other Turner offices are located in New York, Philadelphia, and Boston.

Nordberg Manufacturing Company, Heavy Machinery Division, Milwaukee 7, Wisconsin, has appointed G. B. Wright as Sales Engineer of its small Engine Department. Mr. Wright comes to Nordberg from the Sterling Engine Company, Buffalo, New York, where he has been a Sales Engineer for the past two years.

Gar Wood Industries, Incorporated, Wayne, Michigan, announces that its newly established Richmond Division, Richmond, California, is now in production on dump truck bodies. Production of other Gar Wood products to satisfy demands in the eleven Western states will be started as quickly as conditions permit.

The Associated General Contractors of America, Incorporated, Washington 4, D. C., have established together with the American Institute of Architects, a joint committee which will consider problems in building construction of mutual concern to architects, contractors, and the public. The committee will be known as the National Joint Cooperative Committee of the A.I.A. and the A.G.C.

Macwhyte Company, Kenosha, Wisconsin, wire rope manufacturer, has appointed W. Howard Minton as direct factory representative for the Gulf Coast Area. Mr. Minton will make his headquarters in Houston, Texas.

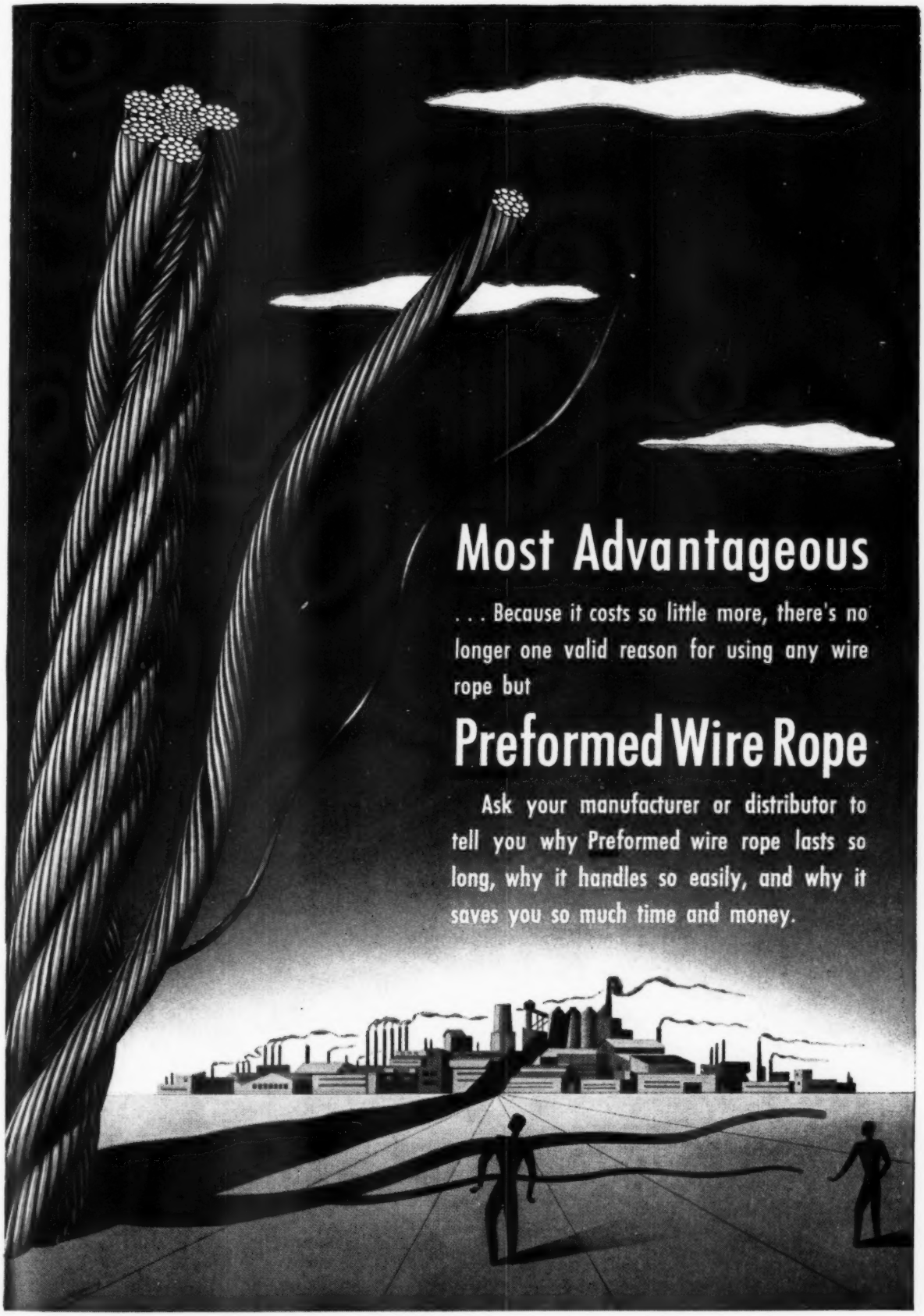
OWEN BUCKETS *are popular for* LOW HEADROOM

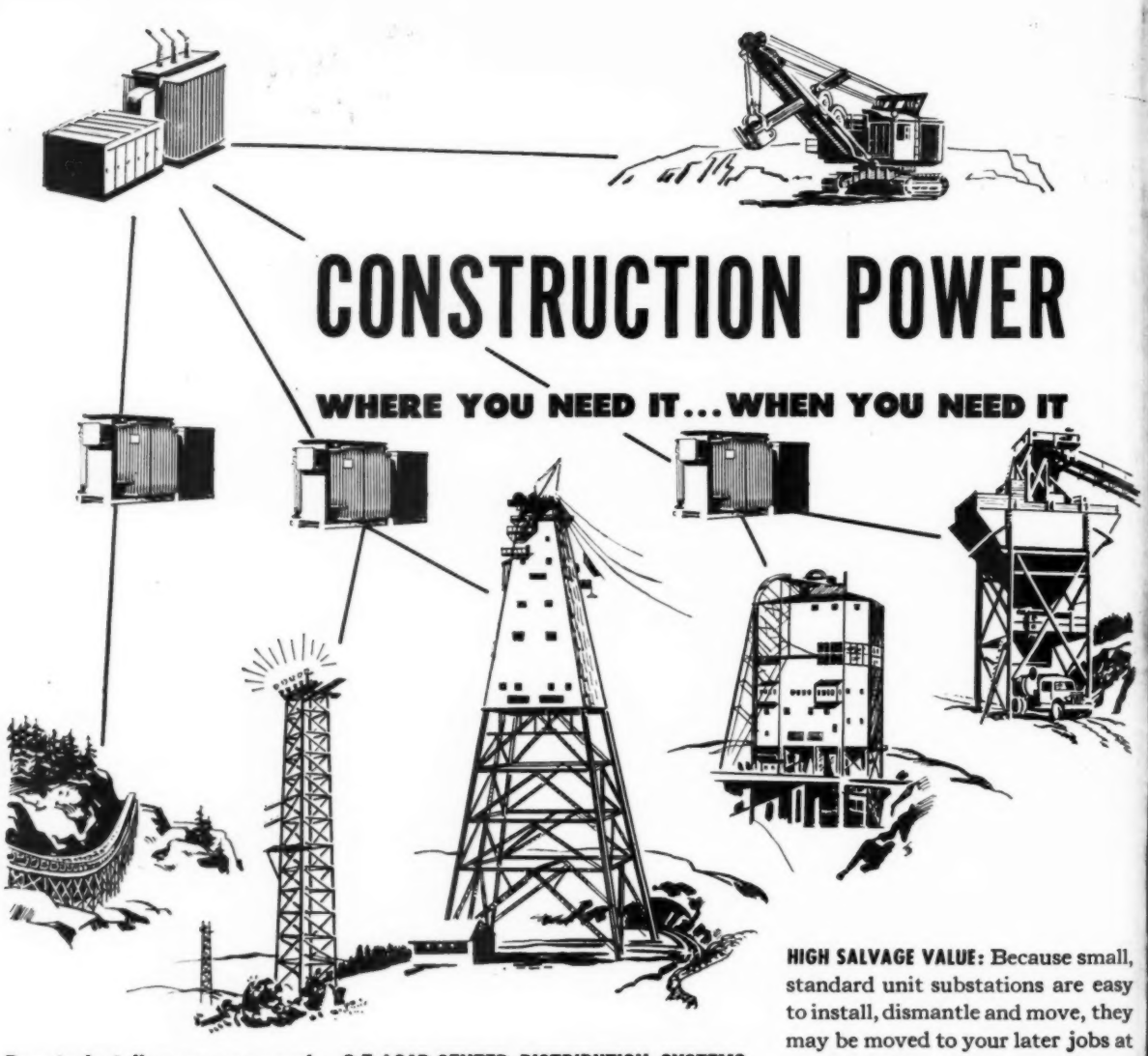
and thus are more adaptable to various operating conditions.

Owen Bucket heads are one-piece alloy steel castings, light enough to prevent top heaviness and designed for rigid arm connections.

Special head design eliminates wear on upper arm ends. Rack and wobble is prevented.

The Owen Bucket Company
6095 Breakwater Avenue, Cleveland, Ohio
Branches: New York • Philadelphia • Chicago • Berkeley, Cal.


Most Advantageous
. . . Because it costs so little more, there's no longer one valid reason for using any wire rope but
Preformed Wire Rope
Ask your manufacturer or distributor to tell you why Preformed wire rope lasts so long, why it handles so easily, and why it saves you so much time and money.



CONSTRUCTION POWER

WHERE YOU NEED IT...WHEN YOU NEED IT

Easy to install, move or expand...G-E LOAD-CENTER DISTRIBUTION SYSTEMS offer reliable, flexible power for large construction projects

Here's how General Electric unit substations, used so successfully in strip mining, can be applied to large, long-term construction jobs . . . at a profit. Their high salvage value, portability and ease of installation will appeal to farsighted contractors. Power costs are reduced, too, by locating the substations near their loads, thereby keeping voltage high and cable short and light. Other advantages:

SAFE: Metal-clad unit substations combine transformers and circuit-breakers in one factory-assembled package; breakers protect your equipment from overload, the metal enclosure protects personnel from injury.

EASY SERVICING: Maintenance personnel work *on the ground* safely, quickly; no poles to climb.

ECONOMICAL: Evaluating the good voltage regulation, short-circuit protection and high service continuity provided, G-E load-center distribution systems give you more for your power-equipment dollar.

HIGH SALVAGE VALUE: Because small, standard unit substations are easy to install, dismantle and move, they may be moved to your later jobs at a substantial saving in man-hours.

These are only a few of the advantages of modern load-center distribution systems for construction work. Let your G-E representative show you the entire picture; he will study your power requirements and help you select the best system for your particular needs. *Apparatus Department, General Electric Co., Schenectady 5, N. Y.*

GENERAL ELECTRIC

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ELECTRIFIED CONSTRUCTION

BETTER PRODUCT ★ LOWER COST